FY 2019

Integrated Comments and Recommendations

on the MWRA's Proposed
Capital Improvement Program
and
Current Expense Budget

MWRA Advisory Board

The Community Advisory Board to the Massachusetts Water Resources Authority

May 2018

The MWRA Advisory Board…

was established by the State Legislature to represent the 60 communities in the MWRA service area. Through annual comments and recommendations on the Authority's proposed capital and current expense budgets and rates, the Advisory Board provides a ratepayer perspective on the MWRA's plans and policies to improve the region's water and sewer systems.

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Fiscal Year 2019

Capital Improvement Program

and

Current Expense Budget

May 2018

Joseph E. Favaloro

Executive Director

Preface

Pursuant to its responsibility under Sections 8 and 23 of Chapter 372 of the Acts of 1984, the MWRA Advisory Board has undertaken a comprehensive review of the Authority's proposed Current Expense Budget and Capital Improvement Program and Budget for the fiscal year beginning July 1, 2018 (FY 2019). The Advisory Board's review has produced these *INTEGRATED COMMENTS AND RECOMMENDATIONS*, which state the Advisory Board's opinions on a number of issues and policies, plus recommendations on proposed spending in each MWRA department. These *Comments and Recommendations* were approved at the May 17, 2018 meeting of the full Advisory Board.

These *Comments and Recommendations* were prepared by Joseph Favaloro, Matthew Romero, James Guiod, and Lenna Ostrodka of the Advisory Board staff. Overall direction was provided by Vice Chairman for Finance, Bernard Cooper, with the participation of Advisory Board members.

All base information for figures and tables, schematics and photographs contained within the *Comments and Recommendations* document are provided by MWRA or their consultants, unless otherwise noted.

The Advisory Board extends its appreciation to MWRA staff for their assistance in reviewing the FY19 Capital and Current Expense Budgets.

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Introduction

By statute the MWRA Advisory Board is charged with reviewing the Massachusetts Water Resources Authority's proposed Capital Improvement Program (CIP) and proposed Current Expense Budget (CEB). Beginning in 2009, the Advisory Board consolidated its review into one *Integrated Comments and Recommendations* document.

The Authority's proposed FY19 rate revenue requirement combined increase is 3.91%, consistent with the Advisory Board's "Four No More" mantra, which began in FY14. Last year's review posed the question of what the next goal for rates should be moving forward; this year's review provides our answer.

The two words that recur in our review are "multi-year" and "challenge." Being the cycle where the Authority sets the next capital spending cap from FY19-23, there is a natural focus on the next five years when reviewing the Authority's proposed CIP. The proposed capital spending cap tops $1.2 billion, up from the current $800 million cap. This dramatic increase provoked vigorous discussion at several Executive Committee and Advisory Board meetings and resulted in the Advisory Board's recommendation to limit the FY19-23 capital spending cap to $950 million.

On the Authority's proposed FY19 Current Expense Budget, the Advisory Board recommends a final rate revenue requirement combined increase of 3.07% for FY19 using a series of recommended reductions as well as updated information provided by the MWRA.

The Advisory Board also takes a multi-year approach when reviewing the projected rate increases moving forward. According to current projections, the greatest challenge lies in the next five years. Rates stay just below 4%, but beyond the five-year period there appear to be rate **decreases** followed by rate increases far lower than those in the next five years. This led the Advisory Board to ask the question: is there a way to "save it forward" or take advantage of the tools available to provide rate relief in the more challenging years from FY19-23 and set the stage for the five years beyond that? Our answer: yes.

Toward this end, the Advisory Board issues a new challenge to the Authority: **"2.4 by '24."**

Essentially, the Advisory Board lays out one pathway to reduce rate increases in FY19-23 below 3.5% and establish flat 2.4% rate increases beginning in FY2024. The Advisory Board emphasizes that there are many different tools that the Authority can use to reduce rates besides those we employ, and further that our "first draft" doesn't change any of the Authority's future assumptions. We demonstrate that meeting this challenge is possible, though there are different ways of achieving the end result.

To answer the question of whether the time is right for this new approach, let's first look at what the MWRA has achieved in recent years. With our support, the MWRA has defeased $538.2 million through year-end surpluses and raised additional funds from ratepayers for optional debt payments in recent years to strategically manage future rates. MWRA has achieved "virtual full funding" of its pension system well ahead of the 2024 schedule through an aggressive approach including optional payments endorsed by the Advisory Board. Following our recommendation to first address the pension and then turn to the OPEB liability, the MWRA created and began funding another post-employment benefits trust with over $24.9 million to date. Furthermore, it has managed to accomplish all this without using rate stabilization funds for several years. With such aggressive approaches and subsequent success on these huge and costly undertakings in the past several years, we believe it is time to aggressively pursue rate relief for communities for the challenging years ahead.

There is no doubt that both recommendations – reducing the capital spending cap by $250 million (21%) and creating a multi-year strategy to achieve 2.4% rate increases by FY24 – are not easy. They are, indeed, challenges, but the Authority has repeatedly demonstrated its ability to rise to a challenge. Though it took several years of painstaking effort, the

Authority changed bond covenants to release over $100 million in reserves to help manage rates. When challenged to set the current cap at $800 million or less, the Authority succeeded. When challenged to meet the “Four No More” mantra, the Authority exceeded expectations at the time. We have no doubt they will rise to the occasion again, and we look forward to working with them to meet these challenges.

Proposed FY19 Capital Improvement Program

Proposed FY19 CIP Highlights

- Currently open capital projects total over $6.5 billion (columns 3 plus 5)
- Over $4.1 billion has been spent on these projects through FY 2017 (column 3)
- A net total of $4.09 billion is treated as completed (and closed out) and removed from the open project list (column 2)
- From the inception of the Authority in 1985 through FY 2017 capital spending totals $8.22 billion (column 4)

Table 1

Currently Active Projects and MWRA Spending Since 1985

($ millions)

Program	Completed (and closed out) Projects	Active Projects Spending through FY17	TOTAL SPENT 1985-2017	MWRA Future Spending	TOTAL (Spent and Future Spending)
Wastewater System Improvements	$3,889.3	$1,996	$5,885.3	$1,337.2	$7,222.5
Waterworks System Improvements	$168.8	2,028	$2,196.8	$1,004.2	$3,202.0
Business & Operations Support	$31.3	98	$129.3	$50.8	$180.1
TOTAL MWRA (w/o Contingency)	**$4,089.4**	**$4,122**	**$8,221.4**	**$2,392.2**	**$10,604.6**

- Future project spending of nearly $2.4 billion is proposed (column 5)
- Total spending, both past and future (as identified to date in the proposed CIP) is just over $10.6 billion (column 6)
- Each year, the Authority includes new projects, as identified in the Master Plan, although not all projects in the Master Plan are in the annual budget document
- The Master Plan, published first in 2006, identified and prioritized $3.1 billion in water and wastewater projects:
    - FY 2007 – 2018 (12 years): nearly $2.034 billion in project needs were identified (66% of the total)
    - FY 2019 – 2048 (30 years): $1.044 billion in future project needs were identified
- The Master Plan was updated in September 2013 with a 40-year look at potential capital expenditures to 2053. The updated Plan identifies (approximately):
    - Wastewater needs: $2.5 billion
    - Waterworks system needs: $1.5 billion
    - Updated total: $4.0 billion
        - FY14-33: $2.0 billion
        - For consideration in future capital budgets: $2.0 billion
- Authority staff are hoping to present an updated Master Plan in Fall 2018

Shift from Mandated Spending to Asset Protection

- Nearly 74% of all spending since 1985 has been for court-mandated projects or major new facilities, including:
    - Deer Island Wastewater Treatment Plant/Boston Harbor Project: $3.8 billion
    - CSO Control Program: $908 million to date
    - MetroWest Water Supply Tunnel: $697.0 million
- Carroll Water Treatment Plant: $419 million to date

- Going forward, the Authority's focus is on Water and Wastewater Asset Protection and on Water System Redundancy projects
- Asset Protection and Water Redundancy spending more than doubles from nearly $486.6 million during the FY14-18 period to over $1.1 billion during FY19-23 (See Table 2)
- CSO Control Program has reached substantial completion (December 2015)
    - Program budget totals $908 million[1]
    - FY19-23 spending: $6.3 million
    - Spending going forward will be for ongoing monitoring
- Negative spending beyond FY 2019 reflects repayments of the loan portions of the community assistance programs

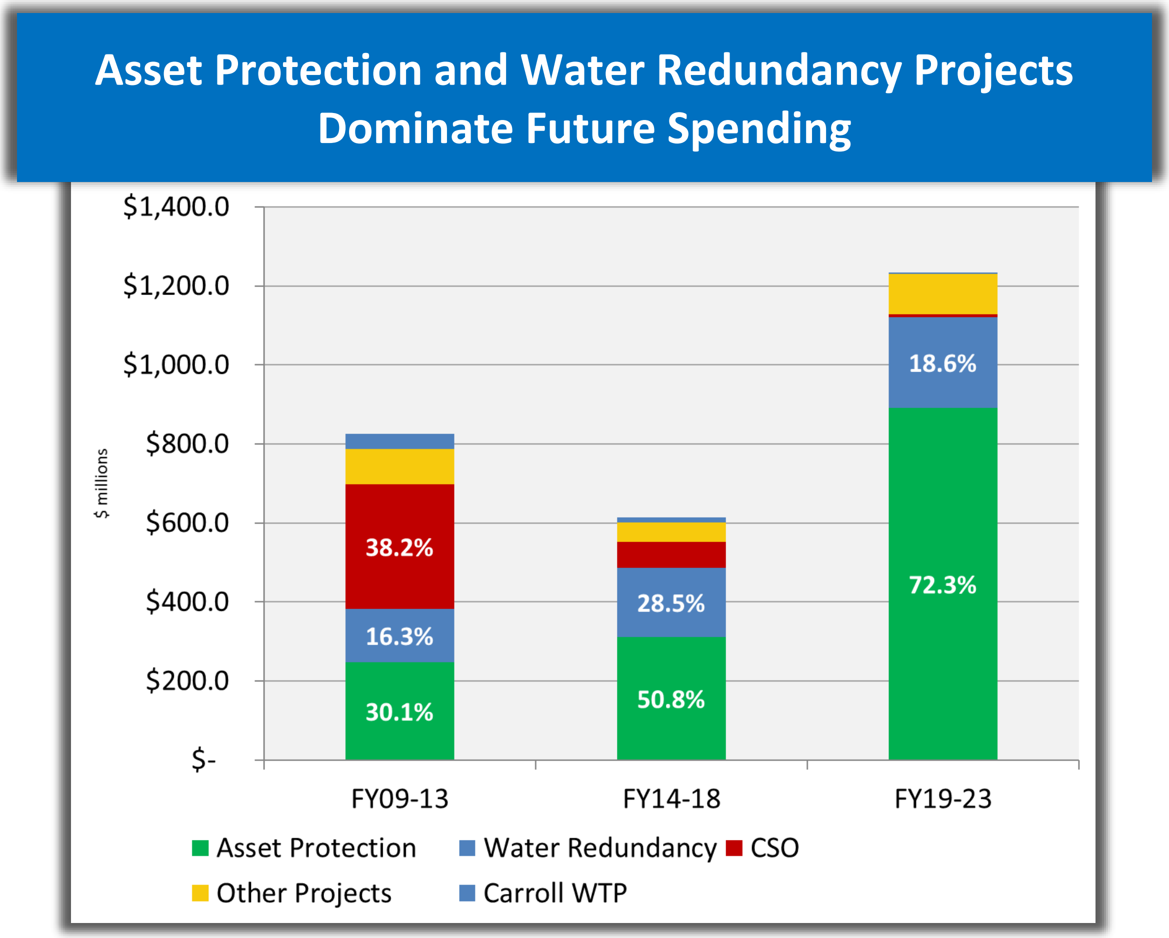

Figure 1

[1] Since updated.

Table 2

Capital Spending by Initiative[2] $ millions				
	FY09-13	**FY14-18**	**FY19-23**	**FY24-28**
Asset Protection	$248.0	$312.0	$891.8	$789.0
Water Redundancy	$134.7	$174.6	$229.5	$505.5
CSO	$315.5	$66.1	$6.3	$0.0
Carroll WTP	$38.5	$11.8	$3.3	$9.3
Other Projects	$88.4	$49.1	$103.2	-$145.6
Total	$825.1	$613.6	$1,234.1	$1,158.2
Asset Protection	30.1%	50.8%	72.3%	68.1%
Water Redundancy	16.3%	28.5%	18.6%	43.6%
CSO	38.2%	10.8%	0.5%	0.0%
Carroll WTP	4.7%	1.9%	0.3%	0.8%
Other Projects	10.7%	8.0%	8.4%	-12.6%
Total	100.0%	100.0%	100.0%	100.0%

[2] Source: MWRA, Proposed FY19 CIP, page 15

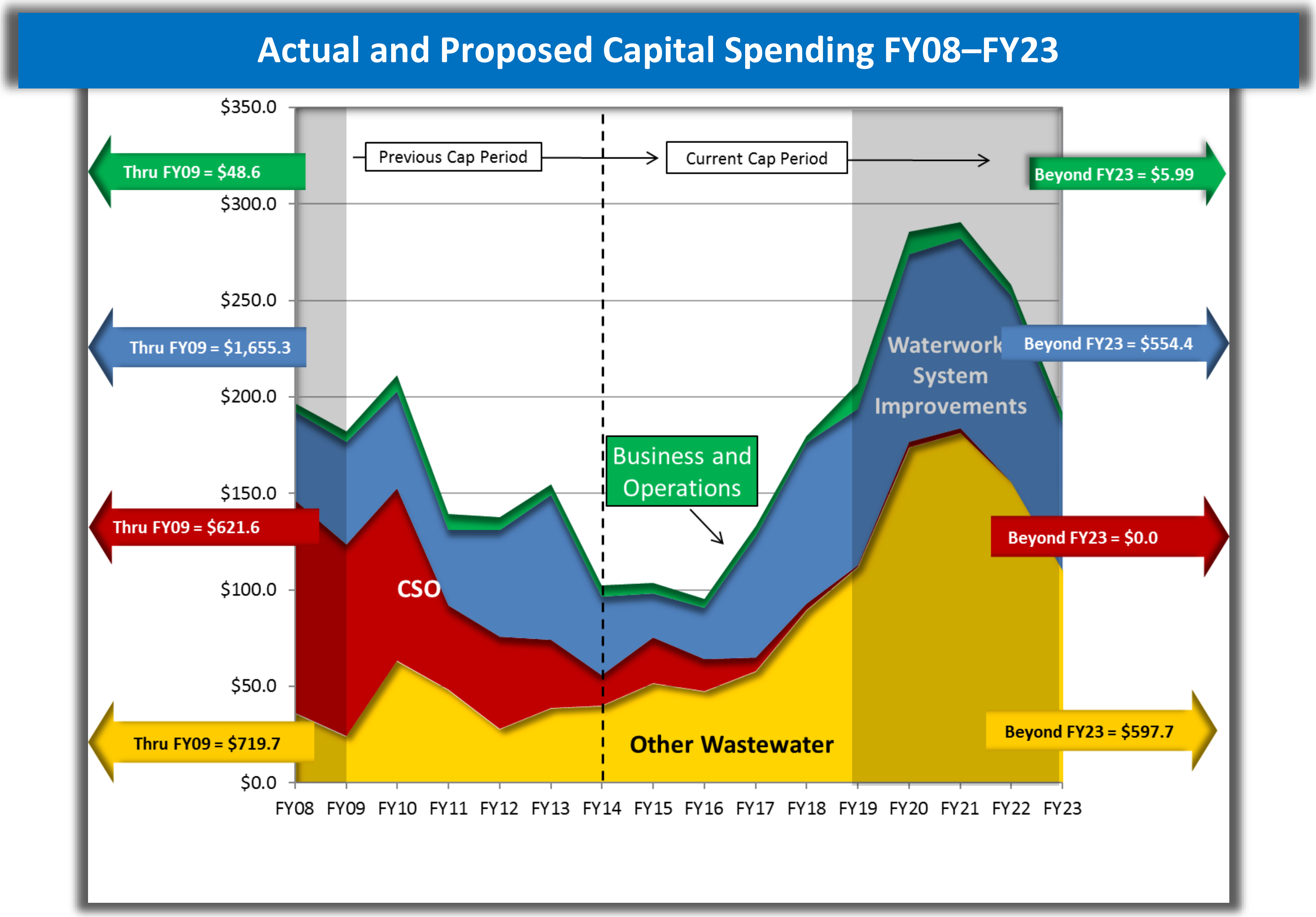
Actual and Proposed Capital Spending FY08–FY23
$350.0
$300.0
$250.0
$200.0
$150.0
$100.0
$50.0
$0.0
Previous Cap Period
Current Cap Period
Thru FY09 = $48.6
Thru FY09 = $1,655.3
Thru FY09 = $621.6
Thru FY09 = $719.7
Beyond FY23 = $5.99
Beyond FY23 = $554.4
Beyond FY23 = $0.0
Beyond FY23 = $597.7
Waterworks System Improvements
Business and Operations
CSO
Other Wastewater
FY08 FY09 FY10 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20 FY21 FY22 FY23

Figure 2

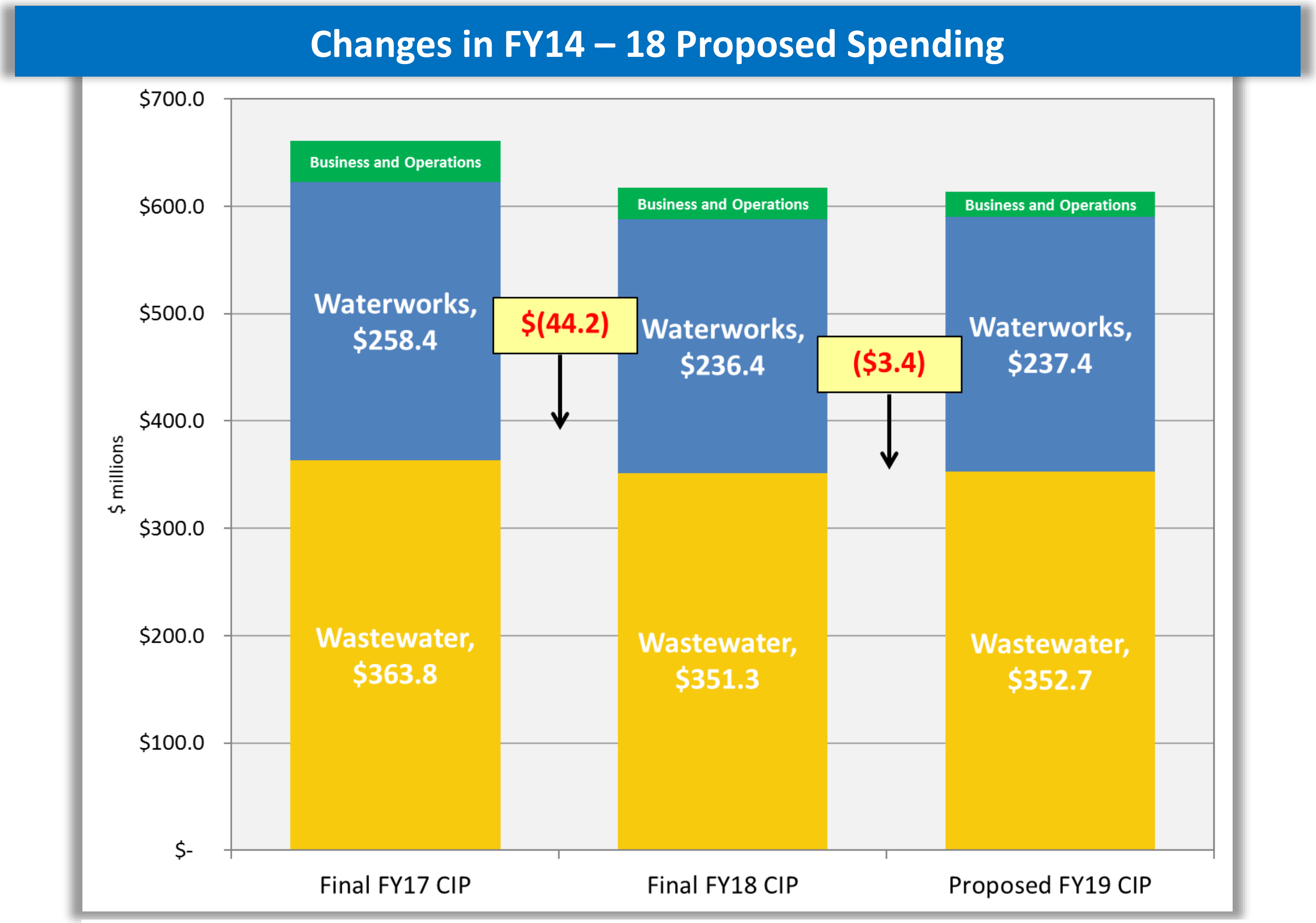

Figure 3

Table 3

Projected FY19-23 Capital Spending by Program

($ millions)

Program	Total Contract	Spending through FY17	Remaining Balance	FY19 Proposed	FY20 Projected	FY21 Projected	FY22 Projected	FY23 Projected	FY19-23
Wastewater System Improvements	$3,524.3	$1,996.1	$1,528.2	$112.7	$176.6	$183.9	$156.1	$110.1	$739.5
Interception & Pumping	1,089.5	562.0	527.5	47.1	64.5	61.6	41.1	26.6	240.9
Treatment	1,024.1	291.8	732.3	46.7	82.9	91.8	91.7	57.4	370.4
Residuals	167.6	64.6	103.0	4.0	3.1	0.8	1.0	1.1	10.0
CSO	910.1	900.5	9.6	0.9	2.8	2.6	0.0	0.0	6.3
Other	332.9	177.0	155.8	14.0	23.2	27.2	22.4	25.0	111.8
Waterworks System Improvements	4,265.4	2,028.4	2,237.0	81.2	**97.2**	**98.3**	**96.7**	**76.5**	**449.8**
Drinking Water Quality Improvements	704.2	645.9	58.2	1.7	1.6	2.8	2.2	0.5	8.9
Transmission	2,512.2	799.0	1,713.2	15.4	29.0	31.8	34.4	41.4	151.8
Distribution and Pumping	961.6	423.5	538.1	42.3	46.8	43.0	39.5	25.3	196.8
Other	87.4	159.9	-72.5	21.8	19.8	20.7	20.6	9.3	92.3
Business & Operations Support	151.8	97.8	54.0	13.3	**12.0**	**8.6**	**5.2**	**5.7**	**44.9**
TOTAL MWRA w/o CONTINGENCY	$7,941.5	$4,122.2	$3,819.3	$207.2	$285.8	$290.8	$258.0	$192.3	$1,234.1

- Final FY17 capital spending from FY14-18 (actual spending plus budgeted and projected spending) totaled $661.2 million
- Final FY18 spending level for the cap period was revised to $617.0 million, a reduction of over $44 million
- The proposed FY19 CIP spending for the five-year cap period is further revised downward to $613.6 million, an additional reduction of nearly $48 million from FY17. The reductions reflect slower and later assumptions for the pace of spending.
- FY14-18 wastewater spending as of the proposed FY19 CIP: $352.7 million
    - Represents 57.5% of total spending for the period
- FY14-18 waterworks spending: $237.4 million
    - $10 million higher than assumed in the proposed FY18 CIP
    - Represents 38.7% of total spending for the five-year period

Table 4

Largest 10 Projects FY19 $ millions				
Utility	**Program**	**Project**	**FY19 Spending**	**% of Total CIP FY19 Spending**
Wastewater	Treatment	206 DI Treatment Pl Asset Protection	$44.88	21.7%
Wastewater	Interception & Pumping	145 Facility Asset Protection	36.94	17.8%
Waterworks	Distribution & Pumping	727 SEH Redundancy & Storage	16.87	8.1%
Waterworks	Distribution & Pumping	722 NIH Redundancy & Storage	14.92	7.2%
Wastewater	Other	128 I/I Local Financial Assistance	13.96	6.7%
Waterworks	Other	765 Local Water System Assistance Program	13.30	6.4%
Wastewater	Interception & Pumping	132 Corrosion & Odor Control	7.93	3.8%
Waterworks	Other	766 Waterworks Facility Asset	7.76	3.7%
Waterworks	Transmission	628 Metro Redundancy Interim Impr	5.25	2.5%
Waterworks	Transmission	624 Cosgrove Tunnel Redundancy	5.20	2.5%
Top 10 Spending in FY19			$167.0	80.6%
Total MWRA FY19 Spending			$207.2	100.0%

- The ten largest projects for FY19 account for $167.0 million or 80.6% of all spending planned for the period
- FY19 proposed CIP spending of $207.2 million makes up 17.3% of the $1.2 billion FY19-23 Cap
- CIP spending between FY14 and FY18 ranged from $95.1 million (FY16) to $179.5 million (projected FY18)
- FY14-18 spending totaled $613.6 million

Wastewater Capital Spending

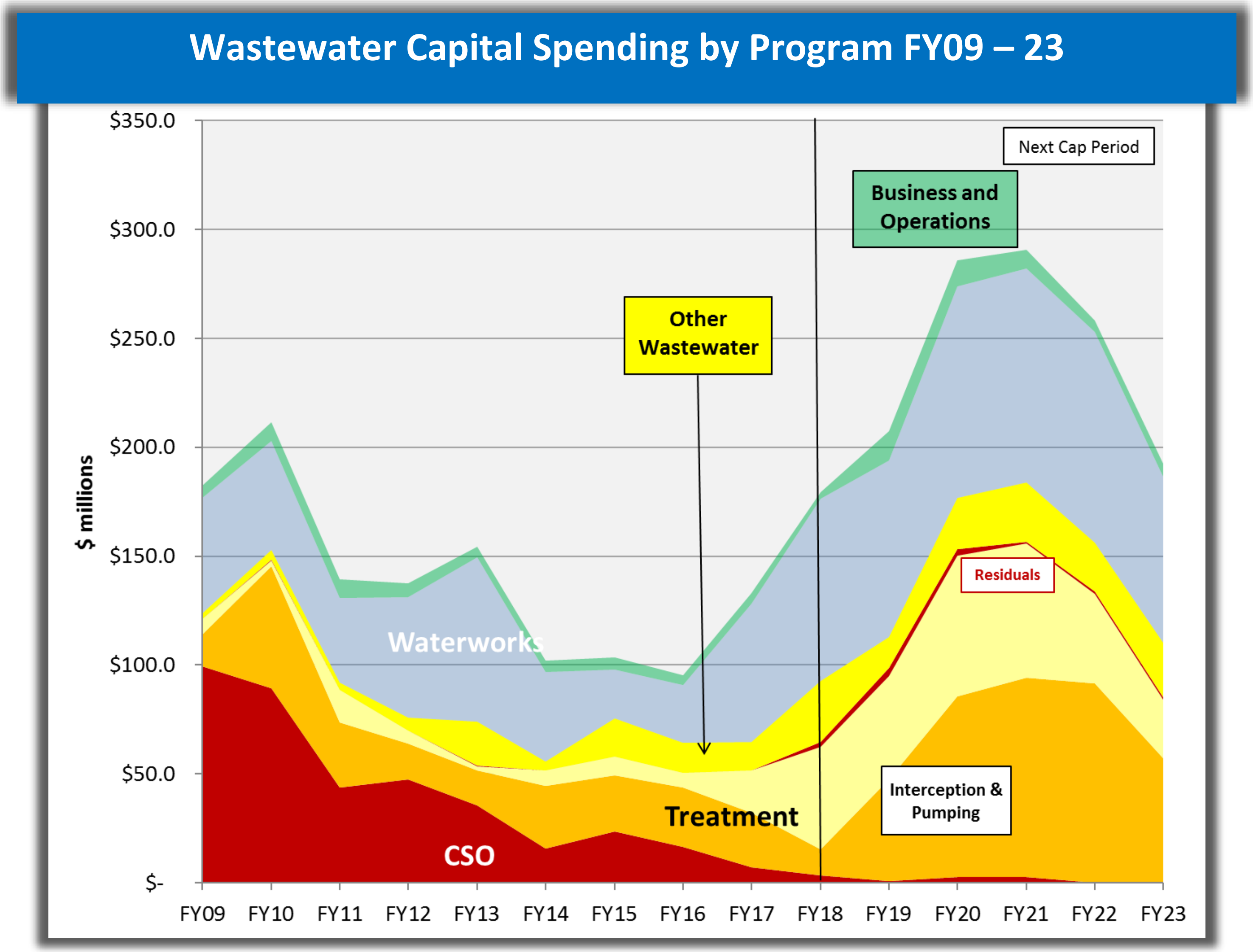

Figure 4

- Wastewater system improvement projects are divided into five categories:
    1. Interception and Pumping projects
    2. Treatment projects (Deer Island and Clinton wastewater treatment plants)
    3. Residuals
    4. Combined Sewer Overflow Program projects
    5. Other (including the I/I Local Financial Assistance program)

Wastewater Spending Highlights

- FY19 spending on wastewater projects is proposed at $112.7 million or 54% of all capital spending proposed for the year
- Together, wastewater capital spending is expected to be 57.5% of all spending for the FY14-18 cap period and 60% of all spending for the FY19-23 cap period

Table 5

Proposed FY19 CIP Largest 10 Wastewater Projects $ millions				
Utility	**Program**	**Project**	**FY19 Spending**	**% of Total Wastewater FY19 Spending**
Wastewater	Treatment	206 DI Treatment Pl Asset Protection	$44.88	39.8%
Wastewater	Interception & Pumping	145 Facility Asset Protection	36.94	32.8%
Wastewater	Other	128 I/I Local Financial Assistance	13.96	12.4%
Wastewater	Interception & Pumping	132 Corrosion & Odor Control	7.93	7.0%
Wastewater	Residuals	271 Residuals Asset Protection	3.99	3.5%
Wastewater	Treatment	210 Clinton Wastewater Treatment Plant	1.84	1.6%
Wastewater	Interception & Pumping	142 Wastewater Meter System - Equipment Replacement	1.31	1.2%
Wastewater	CSO Planning & Support	324 CSO Support	0.93	0.8%
Wastewater	Interception & Pumping	137 Wastewater Central Monitoring	0.40	0.4%
Wastewater	Interception & Pumping	104 Braintree-Weymouth Relief	0.29	0.3%
Top 10 Wastewater Spending in FY19			**$112.46**	**99.8%**
FY19 Wastewater Spending			**$112.73**	**100.0%**

- Ten wastewater projects account for nearly all wastewater spending during FY19; the largest are:
- Deer Island Treatment Plant Asset Protection
- Wastewater Facility Asset Protection
- I/I Local Financial Assistance (net of loan repayments)
- Corrosion and Odor Control
- Residuals Asset Protection

Interception and Pumping (I&P) Projects

- Includes projects that address the wastewater collection system facilities, sewers, and tunnels. Among them are:
    - Four remote headworks facilities
    - Twenty pump stations and CSO facilities
    - More than 250 miles of sewer pipes
    - Four cross harbor tunnels to the Deer Island plant totaling 18 miles
- Proposed FY19 spending: $47.1 million
- Total projected FY14-18 cap spending: $88.5 million, $240.9 in FY19-23 cap period.
- Facility Asset Protection is the largest group of contracts in the I&P projects category
    - FY19 spending: $36.9 million
        - This is over 78% of all I&P spending for the fiscal year
    - Total future spending is $336 million (from FY19 going forward)
        - $155 million of this amount is scheduled for the next cap period (FY19-23)
    - Wastewater Facility Asset Protection has over 70 subphases (contracts)
        - 5 contracts make up 84.9% of FY19 spending
        - 10 contracts make up 93.3% of FY19 spending

Table 6

Largest I&P Facility Asset Protection Contracts

$ millions

Subphase	FY19 Spending	FY14-18 Spending
Chelsea Creek Upgrades - Construction	$25.75	$34.73
Alewife Brook Pump Station Rehab - Construction	2.36	10.96
Prison Point/Cottage Farm Pump and Gearbox Rebuilds		6.44
NI Electrical & Grit/Sreenings Conveyance System - Construction		5.19
Chelsea Screenhouse Upgrades		4.95
Chelsea Creek Upgrades - Design/CA	1.12	4.72
Caruso Pump Station Improvements - Construction		4.40
Interceptor Renewal 1, Reading Extension - Construction	0.60	1.45
Total	**$29.83**	**$72.85**
% of Facility and Asset Protection Spending	**80.8%**	**87.2%**

- Other I&P projects with measurable future spending after the FY19-23 cap period include:
  - Columbus Park Headworks Construction ($56.05 million)
  - Ward Street Headworks Construction ($56.05 million)
  - Construction CB1 Sections 26 & 27 ($30 million)
  - Cottage Farm Rehab Construction ($11.6 million)

Table 7

Chelsea Creek Headworks

All three remote headworks were built in 1967 and upgraded in 1987. All three facilities operate 24 hours per day.

Chelsea Creek Headworks in located in Chelsea and has an average daily flow of 135 mgd. It serves 16 north system communities.

Contracts	Before FY19	FY19	FY20	FY21	FY19-FY23	Beyond FY23	Totals
Headworks	**$42,781,943**	**$27,772,633**	**$16,420,186**	**$3,599,455**	**$47,792,274**	**$0**	**$138,366,491**
Chelsea Creek Upgr Design/CA	7,014,871	1,122,000	1,122,000	373,960	2,617,960	0	**$12,250,791**
Chelsea Creek Upgrades REI	1,028,240	879,489	879,488	659,616	2,418,593	0	**$5,865,426**
Chelsea Hdwk-Caruso PS Utility	10,856	21,144	0	0	21,144	0	**$53,144**
Chelsea Creek Upgr Construction	34,727,976	25,750,000	14,418,698	2,565,879	42,734,577	0	**$120,197,130**
Totals	**$42,781,943**	**$27,772,633**	**$16,420,186**	**$3,599,455**	**$47,792,274**	**$0**	**$138,366,491**

Previous Spending Summary	Current Cap Spending Summary	Future Spending Summary
	Chelsea Creek Upgr Design/CA 64.8% complete. Chelsea Creek Upgrades REI 6.6% complete. Chelsea Creek Upgr Construction 8.8% complete.	

Table 8

Columbus Park & Ward Street							
Preliminary design report proposes replacements/upgrades to the screens, grit and screening collection and conveyance systems, odor control, HVAC, mechanical, plumbing, instrumentation, PCB removal, electrical systems, and antenna towers. Final design and construction contracts for the Columbus Park (in South Boston; 40 mgd) and Ward Street Headworks (upstream of Columbus Park and also located in Boston; 90 mgd) are to follow work on the Chelsea Creek Headworks and will reflect lessons from first project.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
Columbus Park Headworks Construction	$0	$0	$0	$0	$0	$0	**$0**
Columbus Park&Ward St. HVAC Upgrades	0	0	0	0	0	0	**$0**
Ward St & Colu Park HWKS Des/CA/REI	0	254,000	1,526,000	1,526,000	6,358,000	5,601,163	**$15,265,163**
Ward St & Columbus Park HWKS Const	0	0	0	0	8,038,000	48,009,521	**$56,047,521**
Totals	**$0**	**$254,000**	**$1,526,000**	**$1,526,000**	**$14,396,000**	**$53,610,684**	**$71,312,684**

Previous Spending Summary	Current Cap Spending Summary	Future Spending Summary
		Columbus Park and Columbus Park Headworks Construction planned to begin in 2022. Ward St & Colu Park HWKS Des/CA/REI planned to begin in February 20019.

Table 9

Cottage Farm							
The Cottage Farm CSO facility was constructed in 1971, and is located next to Magazine Beach on the Cambridge side of the Charles River.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
CF PCB Abatement Design/CA	$0	$0	$0	$0	$0	$0	**$0**
CF Rehab Design/CA/REI	0	0	0	0	1,114,000	1,222,167	**$2,336,167**
Cottage Farm Construction 1 (PCB)	0	0	0	0	0	0	**$0**
Cottage Farm Fuel System Upgrade	497,558	0	0	0	0	0	**$497,558**
Cottage Farm Rehab Const	0	0	0	0	0	11,680,831	**$11,680,831**
P/P & C/F Washdown Sys Pipe - Design	0	0	0	0	0	0	**$0**
PP/CF Engine Pumps Gearbox	6,439,438	0	0	0	0	0	**$6,439,438**
Prison PT/CF GB Pump/ESDC	314,767	0	0	0	0	0	**$314,767**
Totals	**$7,251,763**	**$0**	**$0**	**$0**	**$1,114,000**	**$12,902,998**	**$21,268,761**

Previous Spending Summary	Current Cap Spending Summary	Future Spending Summary
The engine, pumps, and gearbox project is complete.		Construction of rehabilitation and facility improvements to start July 2021.

Table 10

Prison Point							
The Prison Point CSO facility was constructed in 1978 and has a maximum capacity of 323 mgd. It is located off Route 28 and Land Boulevard in Cambridge near the museum of Science.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
P/P & C/F Washdown Sys Pipe - Design	$0	$0	$0	$0	$0	$0	**$0**
PP Dry Weather Flow&Strip Pump Improv	0	0	0	0	0	0	**$0**
PP/CF Engine Pumps Gearbox	6,439,438	0	0	0	0	0	**$6,439,438**
Prison Point Des/CA/RI	1,209,175	409,731	409,731	409,731	1,629,195	0	**$4,067,563**
Prison Point HVAC Upgrades - Design	441,387	0	0	0	0	0	**$441,387**
Prison Point Piping Rehab	489,599	0	0	0	0	0	**$489,599**
Prison Point Rehab - Const	0	0	5,000,000	17,052,431	34,102,431	0	**$56,154,862**
Prison PT/CF GB Pump/ESDC	314,767	0	0	0	0	0	**$314,767**
Totals	**$8,894,366**	**$409,731**	**$5,409,731**	**$17,462,162**	**$35,731,626**	**$0**	**$67,907,616**

Previous Spending Summary	Current Cap Spending Summary	Future Spending Summary
Affected by $21 million project completed in 2001 which upgraded chlorine disinfection systems, added dechlorination systems, process control and safety improvements at five CSO facilities. The engine, pumps, and gearbox project is complete. $50,000 facility optimization project completed in 2008 reduced treated CSO discharges into the Upper Inner Harbor.	Prison Point Des/CA/RI 22.9% complete. Prison Point Piping Rehab 43.1% complete.	Prison Point rehabilitation work involves improvement/installations of systems for flood control and energy efficiencies. Security and fire alarm to be included. Prison Point Rehab - Const planned to begin in March 2019.

Table 11

Alewife Brook Pump Station							
The Alewife Brook Pump Station was built in 1951 in Somerville. Alewife receives wastewater from portions of Arlington, Belmont, Cambridge, Medford, and Somerville; all flow is conveyed to Deer Island for treatment. The project will improve pumping capacity and will incorporate preventative measures for climate change. The rehabilitation will include replacing the three original wet weather pumps, motors, and piping, replacing the influent screens and grinders, updating the HVAC system, upgrading the electrical system, remediating PCB-containing paints, and modifying the building interior to meet current building codes, energy efficiency improvements, flood protection measures, and security improvements.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
Alewife Brook PS Final Des/CA/REI	$1,717,104	$191,188	$0	$0	$191,188	$0	**$2,099,480**
Alewife Brook Pump Stn Rehab - Const.	10,964,391	2,362,487	0	0	2,362,487	0	**15,689,365**
Alewife Brook Pump Stn Rehab - Des/CA	223,194	0	0	0	0	0	**223,194**
Alewife Brook Pump Stn Screens-Const	0	0	0	0	0	0	**0**
Totals	**$12,904,689**	**$2,553,675**	**$0**	**$0**	**$2,553,675**	**$0**	**$18,012,039**

Previous Spending Summary	Current Cap Spending Summary	Future Spending Summary
Alewife Brook Pump Stn Rehab - Des/CA 100% complete.	Alewife Brook PS Final Des/CA/REI 67.0% complete. Alewife Brook Pump Stn Rehab - Const. 27.6% complete.	No projected spending on the project after FY19.

Wastewater Treatment

- Deer Island Treatment Plant Asset Protection
- Clinton Wastewater Treatment Plant
- Laboratory Instrumentation (see Equipment Purchase project under Business and Operations Support)

Deer Island Wastewater Treatment Plant

- Deer Island Asset Protection is the largest capital project in FY19 and the FY19-23 cap period, but is actually made up of several large "sub-projects," the largest of which are shown in the tables below
- Spending in FY19 is budgeted at $44.8 million or 21.6% of all capital spending
- Total project costs increased by $102.0 million in the proposed FY19 budget (as compared to the final FY18 budget), from $859.1 million to $961.24 million.

Table 12

Top Deer Island Projects by Period ($ millions)			
FY14-18			
Suphase		*$*	
Scum Skimmer Replacement	$	20.39	80.0% of total spending
NMPS VFD Replacement - Constructio	$	17.89	
NMPS & WTF Butterfly Valve Replace.	$	17.60	
Electrical Equipment Upgrade - Const	$	7.87	
Power System Improvements - Constr	$	4.71	
WTF VFD Replacement - Construction	$	4.12	
Centrifuge Backdrive Replacement	$	3.64	
Cryogenics Chillers Replacement	$	3.22	
DSL Pump Replacement - Phase 2	$	2.67	
Secondary Reactor VFDs	$	2.30	
All (36) other contracts	$	21.39	
TOTAL	$	105.80	
FY19-23			
Suphase		*$*	
Clarifier Rehab Phase 2 - Constructior	$	129.90	80.9% of total spending
HVAC Equipment Replacement - Cons	$	38.79	
Fire Alarm System Replacement - Con	$	20.00	
SSPS VFD Replace Const	$	19.64	
Gravity Thickener Rehab	$	18.00	
Digester & Storage Tank Rehab - Cons	$	12.86	
MCC & Switchgr Replace Const	$	10.59	
Hydroturb Repl Const	$	8.61	
Switchgear Relay Replac Constr	$	8.00	
WTF VFD Replacement - Construction	$	7.83	
DI As-needed Technical Design	$	7.75	
PICS FiberLoop Replac	$	7.07	
Cathodic Protection - Construction	$	6.70	
All (39) other contracts	$	69.86	
TOTAL	$	365.61	

Table 13

Electrical Equipment Upgrade							
This phased program, to replace bus ducts and substation components, has been ongoing since 2001, with future spending estimates included into the mid 2020's.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond 23**	**Totals**
Electrical Equipment Upgrade-Const 2	$1,913,183	$0	$0	$0	$0	$0	**$1,913,183**
Electrical Equipment Upgrade 3 - REI	1,111,984	0	0	0	0	0	**$1,111,984**
Electrical Equipment Upgrade-Const. 3	15,173,750	0	0	0	0	0	**$15,173,750**
Electr Equip Upgr 4 REI	858,375	0	0	0	0	0	**$858,375**
Electrical Equipment Upgrade-Const 4	7,871,148	0	0	0	0	0	**$7,871,148**
Electrical Equipment Upgrade Phase 5	0	0	0	0	0	23,161,875	**$23,161,875**
Totals	**$26,928,440**	**$0**	**$0**	**$0**	**$0**	**$23,161,875**	**$50,090,315**
Previous Spending Summary		**Current Cap Spending Summary**			**Future Spending Summary**		
Many substations and individual components distribute power to all of the facilities on Deer Island. The components include transformers, load break switches, bus ducts, cables, conduit, motor control centers, and protective relaying systems. Four upgrade contracts have been approved over the last 15 years. Electrical Equipment Upgrade Phase 4 (a 3-year contract), is now completed.					Phase 5 construction is not budgeted to begin until the FY24-28 cap period. The scope will reflect lessons learned from the previous contracts.		

Table 14

Combined Heat & Power							
The project is to optimize the use of methane gas produced from the existing sludge processing system. A new combined heat and power facility would combine gas-fired turbines, and would increase electrical production and self-generation.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond 23**	**Totals**
Combined Heat & Power Design	$55,300	$663,600	$110,600	$0	$774,200	$0	**$1,603,700**
Combined Heat & Power Constr	0	0	0	0	1,729,167	81,270,833	**$83,000,000**
Totals	**$55,300**	**$663,600**	**$110,600**	**$0**	**$2,503,367**	**$81,270,833**	**$84,603,700**
Previous Spending Summary		**Current Cap Spending Summary**			**Future Spending Summary**		
		Design work is scheduled to begin June 2020; scope is being reviewed and can be expected to be extended.			Construction is scheduled to begin December 2022. Schedule may be extended to reflect revised time frame for feasibility study and preliminary and final design work.		

Table 15

HVAC Equipment Replacement							
The project will involve replacement of two obsolete HVAC control systems with one manufacturer's system, reducing replacement parts and improving automation. Includes replacement of fume hoods in the laboratory.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
HVAC Equipment Replacement - Const.	$0	$7,758,400	$11,637,600	$13,577,200	$38,792,000	$0	**$71,765,200**
HVAC Equipment Replacement - Des/ESDC	1,337,791	643,651	0	0	643,651	0	**$2,625,093**
Totals	**$1,337,791**	**$8,402,051**	**$11,637,600**	**$13,577,200**	**$39,435,651**	**$0**	**$74,390,293**
Previous Spending Summary		**Current Cap Spending Summary**			**Future Spending Summary**		
Design contract was awarded in the spring 2014.		HVAC Equipment Replacement - Des/ESDC is 64.4% completed. Planned end October 2020.			Contruction contract is currently scheduled for March 2018; maybe extended. Construction costs continue to be updated and increased.		

Table 16

Fire Alarm System Replacement							
The project includes the replacement of the existing fire alarm system at Deer Island; including the front end, graphical panels, and all field devices. It may also include the replacement of the existing fiber optic data highway, based on an assessment to be conducted by the design consultant. It is one of the largest fire alarm systems in New England.							
Contracts	**Before FY19**	**FY19**	**FY20**	**FY21**	**FY19-FY23**	**Beyond FY23**	**Totals**
Fire Alarm System Replacement-Design	$798,415	$125,475	$362,785	$362,786	$1,250,124	$30,232	**$2,929,817**
Fire Systm Repl REI	0	204,444	613,333	613,334	2,300,000	0	**$3,731,111**
Fire Alarm System Replacement - Const	0	1,904,762	5,714,286	5,714,286	20,000,000	0	**$33,333,334**
Totals	**$798,415**	**$2,234,681**	**$6,690,404**	**$6,690,406**	**$23,550,124**	**$30,232**	**$39,994,262**
Previous Spending Summary		**Current Cap Spending Summary**			**Future Spending Summary**		
The Board awarded a design contract in October 2015 which includes preliminary design, final design, and engineering services during construction.		Fire Alarm System Replacement-Design is 26.3% completed.			The construction contract is budgeted to run from September 2018 to September 2022; the system is estimated for replacement every 20 years.		

Table 17

Deer Island Treatment Plant versus Clinton Treatment Plant Spending FY14-18

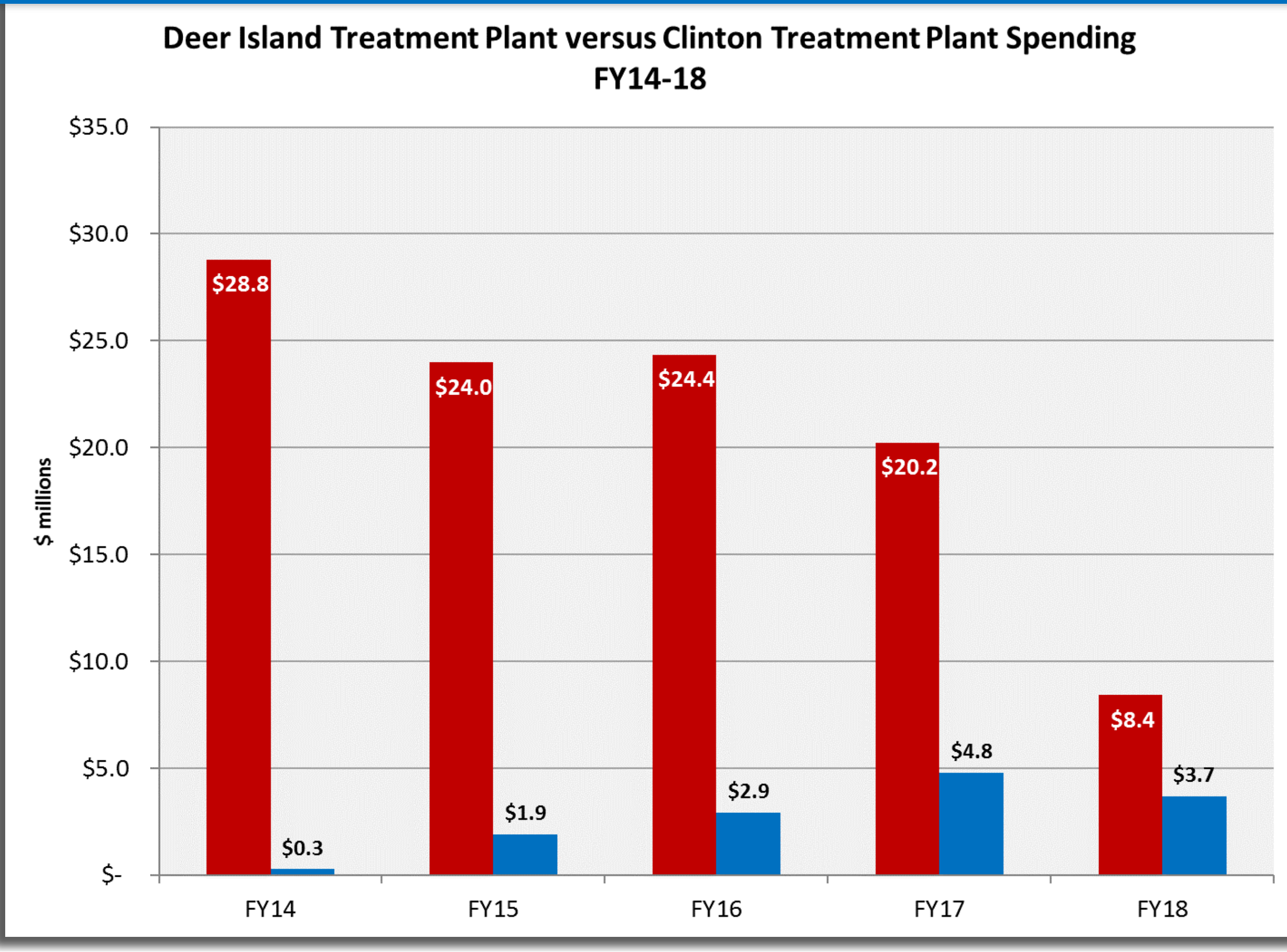

Figure 5

- Total project costs increased by $5.9 million from $23.5 million to $28.4 million
- Spending during FY19: $1.8 million
  - Phosphorus removal construction FY17-18 spending: $7.4 million
- Spending from FY14-18: $13.5 million
  - Phosphorus removal construction FY14-18 spending: $7.6 million
- Spending from FY19-23: $4.8 million

Table 18

Clinton Wastewater Treatment Plant ($ millions)			
Projects	FY 09-13	FY14-18	Beyond 18
Clinton Soda Ash Replacement	$0.15		
Clinton Plant-Wide Concrete Repair	$0.06		
Clinton Digester Cleaning and Rehab	$0.09	$3.35	
Clinton Aeration Efficiency Improvement	$1.88	($0.01)	
Clinton WWTP Influent Gates			
Clinton WWTP Auzillary Pumps			
Clinton WWTP Rehab Des/ESDC/RE			$1.0
Valves and Screw Pumps Replacement			$1.25
Phosphorus Removal - Design		$1.58	$0.01
Phosphorus Removal - Construction		$7.62	
Clinton Roof Rehab		$0.55	$0.69
Clinton Facilities Rehab			$4.55
National Grid Gas Line		$0.49	
Screw Pump Replacement - Phase 2 Construction			$7.60
TOTAL	**$2.18**	**$13.58**	**$15.10**

Residuals

- Total future spending is proposed at $57.2 million[3]
- Condition assessment/technology and regulatory review have been conducted
  - Total budget was $0.83 million
  - Results may point to need for additional feasibility studies on possible process change
- Spending during FY19 is budgeted at $4.0 million
- Total budgeted costs are unchanged from the final FY18 CIP, at $167.6 million

[3] FY19 and beyond

Combined Sewer Overflow Control Program

- Substantial completion on the multi-year CSO Control Program was reached by the court-ordered date of December 2015. All of the 35 projects are complete
- The Authority has been constructing the projects in the Long-Term Control Plan for over 20 years, since 1996, according to the December Court Report
- The CSO Control Program has included the management of 125 contracts, including 82 construction contracts, 33 engineering contracts, and 10 planning and technical support contracts, as well as 6 community financial assistance agreements. To date, MWRA has spent $900.5 million on the CSO control efforts, or 98.9% of the $910.1 million budget, on the 35 CSO projects
- Region-wide CSO discharge volume in a typical rainfall year has been reduced from 3.3 billion gallons to 0.4 billion gallons, an 88% reduction, with at least 93% of the remaining CSO volume treated at MWRA's four remaining CSO facilities
- Total project costs: $910.1 million
- Change from FY18 CIP: +$.45 million
- Much lower levels of spending will continue through FY2021, when MWRA is to complete a sewer system performance assessment verifying attainment of the goals for long-term CSO control levels
- Cash flows and spending schedules are tied to dates established in the Court Order
- MWRA has five years following construction of the last CSO project in 2015 to complete, by December 2020, post-construction monitoring and a performance assessment to verify the approved long-term levels of CSO are achieved
- As part of the agreement, DEP agreed to continue to reissue, and EPA agreed to approve, the Charles River and Alewife Brook/Upper Mystic River CSO variances through 2020 without additional CSO controls beyond the approved plan

Table 19

CSO Spending ($ millions)			
Project	**FY09-13**	**FY14-18**	**Beyond FY19**
North Dorchester Bay	$82.58	($0.11)	
East Boston Branch Sewer Relief	$74.94	($0.01)	
MWR003 Gate & Siphon	$0.65	$3.7	
Dorchester Bay Sewer Separation (Fox Point)	$0.39	$0.88	
Dorchester Bay Sewer Separation (Commercial Point)	$6.26	($1.29)	$3.76
Stony Brook Sewer Separation	($0.86)	$0.12	
Union Park Detention Treatment	($0.27)	$0.00	
Cambridge Sewer Separation	$32.03	$53.06	
Cambridge Floatables	$0.16	$0.40	
Fort Point Channel Sewer Separation	$3.72	($0.50)	
Morrissey Boulevard Drain	$17.67	($0.17)	
Reserved Channel Sewer Separation	$57.32	$10.48	
Brookline Sewer Separation	$24.73	($1.28)	
Bulfinch Triangle Sewer Separation	$9.36	($0.83)	
Charles River CSO	$2.53	$0.00	
CSO Support	$4.28	$0.87	$2.6
TOTAL	**$315.49**	**$65.32**	**$6.36**

Other Wastewater Projects

Infiltration/Inflow Local Financial Assistance Program

- Includes one major project/program: the Infiltration/Inflow Local Financial Assistance Program
- Total budget: $332.5 million
- Net remaining balance: $155.8 million
- FY19 net budget: $14.0 million
- Net budget for FY19-23: $111.8 million
- Program inception: August 1992
    - Phase 1 and 2: 25% grants/75% loans
    - Phases 3 through Phase 8: 45% grants/55% loans
        - Total each phase: $40 million
        - Repayment period: five years
    - Phases 9 and 10: 75% grants/25% interest-free loans
        - Total each phase: $80 million
        - Repayment period: ten years
    - Phases 11 and 12 (proposed): 75% grants/25% interest-free loans
        - Total each phase: $60 million
        - Repayment period: ten years

- Through February 2018:
  - Distributed: $352.4 million
  - All 43 wastewater communities have participated
- Total funding for all ten (approved) phases: $460.75 million
  - Distributed: $352.4 million
  - Remaining: $108.3 million

The Advisory Board recommends the proposed Phase 11 and 12 funding level of $120 million be increased to $200 million. As well as the installation of a $100 million dollar, 10-year, interest free interim loan program for communities seeking additional funding prior to the conclusion of Phases 11 and 12. The program would have the same allocation methodology of the traditional I/I program and aide communities that aggressively utilize I/I funding before new phases are implemented.

Waterworks Capital Spending

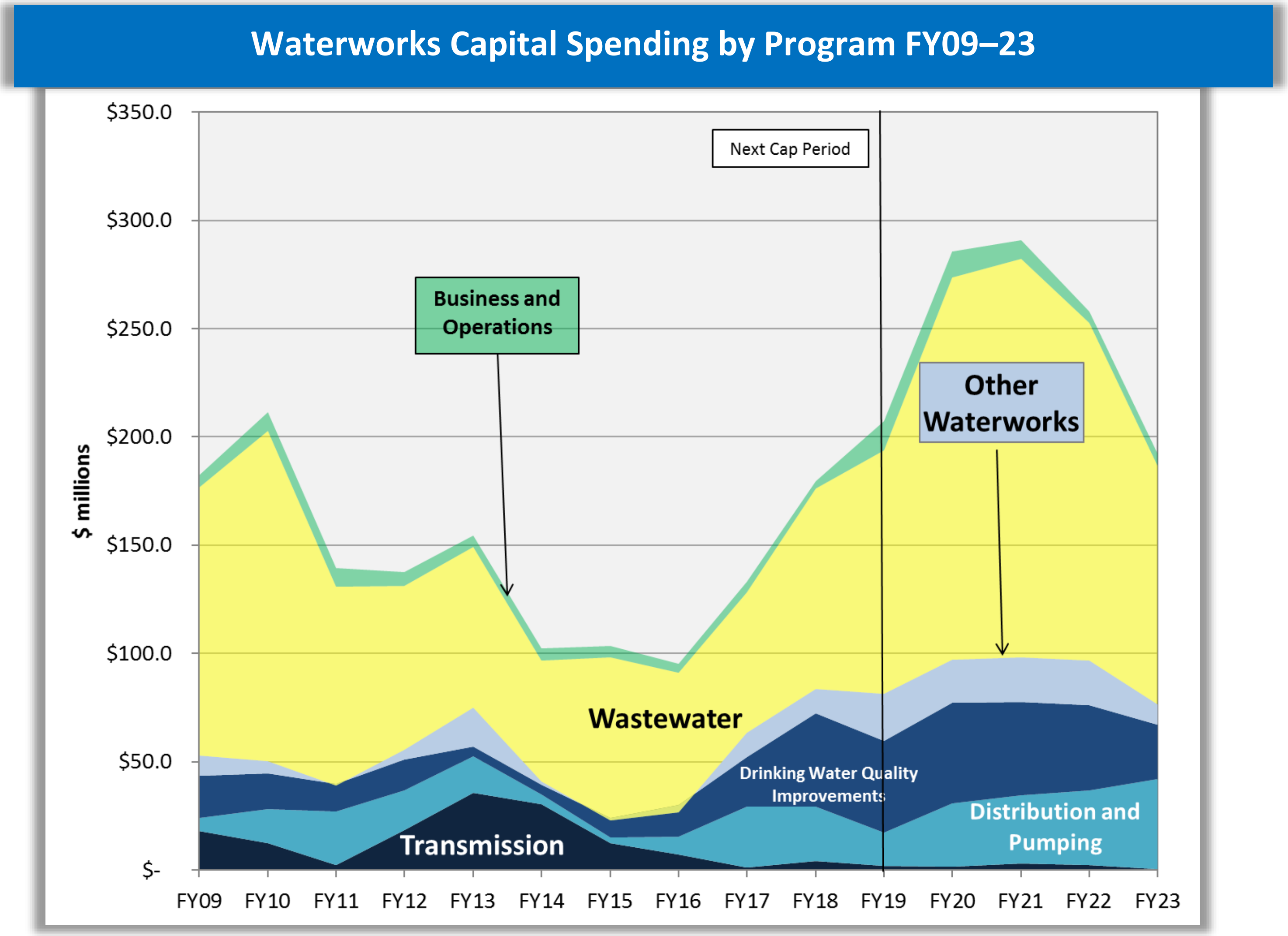

Figure 6

- There are four main categories of Waterworks spending
    1. Drinking Water Quality Improvements
    2. Transmission
    3. Distribution and Pumping
    4. Other projects

- Active waterworks projects in the proposed CIP: $4.3 billion
    - Increase from proposed FY18 CIP: $254 million (final FY18)
    - Spending through FY17 is $2.028 billion
    - Balance going forward is $2.237 billion
- Proposed FY14-18 spending: $237.4 million
- Proposed FY19-23 spending: $449.8 million
- Proposed FY19 spending: $81.2 million
- Ten projects make up nearly all Waterworks spending for FY19
- Six of these are in the Authority's ten largest projects for FY19:

1. Southern Extra High Redundancy and Storage ($16.87 million)
2. Northern Intermediate High Redundancy and Storage ($14.92 million)
3. Local Water System Assistance Program ($13.30 million)
4. Waterworks Facility Asset Protection ($7.76 million)
5. Metro Redundancy Interim Improvements ($5.25 million)
6. Cosgrove Tunnel Redundancy ($5.20 million)

Table 19

Largest 10 Waterworks Projects
FY19
$ millions

Utility	Program	Project	FY19 Spending	% of Total Waterworks FY19 Spending
Waterworks	Distribution and Pumping	727 SHE Redundancy & Storage	$16.87	20.8%
Waterworks	Distribution and Pumping	722 NIH Redundancy & Storage	14.92	18.4%
Waterworks	Other	765 Local Water System Assistance Program	13.30	16.4%
Waterworks	Other	766 Waterworks Facility Asset Protection	7.76	9.6%
Waterworks	Transmission	628 Metro Redundancy Interim Improvements	5.25	6.5%
Waterworks	Transmission	622 Cosgrove Tunnel Redundancy	5.20	6.4%
Waterworks	Distribution and Pumping	702 New Connect Mains – Shaft 7	2.85	3.5%
Waterworks	Distribution and Pumping	693 NHS – Revere & Malden Pipe	2.71	3.3%
Waterworks	Distribution and Pumping	618 Peabody Pipeline Project	2.20	2.7%
Waterworks	Distribution and Pumping	723 Nor Low Service Rehab Section 8	1.85	2.3%
Top 10 Waterworks Spending in FY19			**$72.9**	**89.80%**

FY19 Waterworks Spending	**$81.2**	**100.00%**

Drinking Water Quality Improvements

- Budgeted FY14-18 spending: $54.8 million
- Proposed FY19-23 spending: $8.9 million
- Proposed FY19 spending: $1.7 million
- These projects focus on the treatment and storage of the MWRA's water supplies including:
    - John J. Carroll Treatment Plant (CWTP) and related contracts
        - FY14-18 spending: $11.8 million
        - Proposed FY19-23 spending: $3.3 million
        - Proposed FY19 spending: $1.7 million
    - Spot Pond Storage Facility and Pump Station
        - FY14-18 spending: $35.7 million
        - Spot Pond Storage Facility and Pump Station is complete

Transmission

- The water transmission system consists of more than 100 miles of tunnels and aqueducts that transport water daily by gravity from the supply reservoirs to points of distribution within the service area.
- Budgeted FY14-18 spending: $69.1 million
- Proposed FY19-23 spending: $151.8 million
- Proposed FY19 spending: $15.4 million
- Largest projects during FY19 include:
    - Metropolitan Redundancy Interim Improvements: $5.3 million
    - Cosgrove Tunnel Redundancy: $5.2 million
    - Metropolitan Tunnel Redundancy: $1.7 million
    - Watershed Land: $1.0 million

Policy Point — Metropolitan Tunnel Redundancy

"Setting the Stage with Interim Redundancy"

In January 2017, the MWRA Board of Directors voted to approve the deep rock tunnel option for water redundancy in the Boston metropolitan area. This followed a thorough discussion by MWRA staff on redundancy options at the October 2016 Board meeting, as well as an Advisory Board MuniWorks conference in December 2016 to garner stakeholder input. Progress on the major project now continues with the hiring of Kathleen Murtagh as Director of Metropolitan Tunnel Redundancy. Ms. Murtagh is a geotechnical engineer with over 28 years of experience and served as Vice President of CDM Smith since 1997. She will assemble her team under the Program Management Division model, an approach recommended by the Advisory Board since its successful use by the Authority during the Boston Harbor Project. Five PMD positions have been included in the FY19 CEB.

While the new PMD team takes shape, interim water redundancy projects are in full swing. In fact, several of the largest waterworks projects in FY19 relate to these improvements: 727 Southern Extra High Redundancy and Storage ($16.9 million), 722 Northern Intermediate High Redundancy and Storage ($14.9 million), and 628 Metropolitan Redundancy Interim Improvements ($5.3 million). The bulk of redundancy expenses are set to take place during the next cap, FY24-28.

To examine these interim redundancy projects for FY19 further, we see that $8.4 million and $7.1 million of the $16.9 million SEH project derive from two phases of pipeline construction from the Bellevue storage tank to Westwood. The project is designed to provide water redundancy for Sections 77 and 88, which serve Boston, Canton, Norwood, Stoughton, and Dedham-Westwood.

Of the $14.9 million designated for the NIH project, $11 million will go towards the Phase 2 construction of Sections 89 and 29. These pipelines serve Reading, Stoneham, Wakefield, Wilmington, Winchester, and Woburn. This project will improve the aging and low-capacity Section 29 pipeline to provide redundancy to Section 89.

Of the $5.3 million budgeted for the Metropolitan Redundancy Interim Improvements group of projects, $1 million will be spent on the MEPA and design for the rehabilitation of WASM 3. Other funds will be spent on Tops of Shafts, Chestnut Hill Emergency Pump Station, and Chestnut Hill Emergency Generator for their environmental review, design, and construction to support the redundancy projects.

Distribution and Pumping

- Includes projects that focus on the metropolitan system, which is divided into seven pressure zones and includes:
    - 284 miles of distribution pipeline east of Shaft 5
    - 11 storage tanks
    - 11 pump stations
    - 9 tunnel shafts
    - approximately 4,700 valves
- FY14-18 spending: $93.7 million
- Proposed FY19-23 spending: $196.8 million
- Proposed FY19 spending: $42.3 million
- Largest projects in FY19:
    - Southern Extra High Redundancy and Storage: $16.9 million
    - Northern Intermediate High Redundancy and Storage: $14.9 million
    - Peabody Pipeline Project: $2.2 million

Other Waterworks Projects

- FY14-18 net spending: $19.7 million
- Proposed FY19-23 spending: $92.3 million
- Proposed FY19 spending: $21.8 million
- FY19 spending includes:
    - Local Water Pipeline Assistance Program: $13.3 million
        - Phase 3 Distributions: +$10.0 million
        - Phase 3 Loan Repayments: -$800 thousand
    - Waterworks Facility Asset Protection: $7.8 million

Business and Operations Spending

- FY19 Business and Operations spending: $13.3 million

Table 20

Largest Business & Ops Projects FY19 ($ millions)	
Project	**FY19 Spending**
IT Infrastructure Program	$4.4
Capital Maintenance Planning & Development	3.6
IT Infrastructure Program	2.2
Capital Maintenance Planning & Development	1.4
TOTAL	**$11.6**

- FY14-18 Business and Operations spending: $23.5 million[4]
- FY19-23 Business and Operations spending: $44.9 million
  - Next cap proposed spending almost double the FY14-18 spending
- MIS-related FY19 spending: $6.9 million
  - Application Improvement Program: $1.4 million
    - FY14-18 spending: $2.9 million
    - FY19-23 spending: $8.4 million
    - To improve efficiencies of business processes associated with managing operations and support divisions
  - Information Security Program: $1.0 million
    - To increase resiliency and sustainability of data security practices
    - FY14-18 spending: $1.1 million
    - FY19-23 spending: $2.0 million
  - Information Technology Management: $200 thousand
    - FY14-18 spending: $0
    - FY19-23 spending: $635.6 thousand
    - To improve oversight process for procurement of IT solutions throughout the Authority
  - IT Infrastructure Program: $4.4 million
    - FY14-18 spending: $4.5 million
    - FY19-23 spending: $10.2 million
    - To implement consolidated and optimized versions of equipment and databases

[4] Unless otherwise noted, all instances of "FY14-18 spending" includes FY14-17 actual spending and FY18 projected spending

MWRA Advisory Board

- Alternative Energy Initiatives: $0
    - FY14-18 spending: $876 thousand
    - FY19-23 spending: $0
    - One remaining subphase – Future Deer Island Wind at Battery D Location – has been rescheduled to FY 2024
        - Projected project cost: $5.1 million
- Capital Maintenance Planning and Development: $3.6 million
    - FY14-18 spending: $4.3 million
    - FY19-23 spending: $9.3 million
        - Includes four as-needed design contracts and two as-needed Construction Services/Resident Engineering Inspection Services contracts
- Capital Equipment purchases: $2.2 million
    - FY14-18 spending: $9.7 million
        - Vehicle Purchases: $6.7 million
        - Major Lab Instrumentation: $574.5 million
    - FY19-23 spending: $11.3 million
        - Vehicle Purchases: $5.7 million
        - Major Lab Instrumentation: $1 million
- Technical Assistance Contract: $383.3 thousand
    - FY14-18 spending: $0
    - FY19-23 spending: $1.2 million
    - Supports such services as land appraisal, surveying, and hazardous materials assessment
- MWRA Facilities Management and Planning: $140 thousand
    - FY14-18 spending: $0
    - FY19-23 spending: $1.8 million
    - Project consolidated existing MWRA projects (DI Maintenance Facilities and DI CSB Demolition) to provide a central point of review and decision making for space planning decisions across the organization

Capital Spending Cap

Background for Setting a Five-Year Cap on Capital Spending, a Recap of the Cap

- The Authority first adopted a capital spending cap in 2001, setting a ten-year cap each year as part of the approval of the final CIP and annual caps for the first three years of the budget period. In each succeeding year, a new ten-year cap was calculated by removing the completed year, adding any unspent funds from the just completed year, and adding a new tenth year in the amount of $100 million[5].
- In June 2003, the Board of Directors adopted a revised capital spending cap policy with a calculation that reflected projected expenditures for a five-year period, plus contingency allowances and inflation adjustments[6], less Chicopee Valley Aqueduct projects.
- A second provision of the cap allows annual spending within the five-year period to vary within plus or minus 20% of the initial amounts calculated for each of the five years, as long as the five-year total is not exceeded. In the event that an annual cap limit is exceeded, the Authority may request approval by the Board of Directors to exceed the limit for an individual fiscal year.

The First Five-Year Cap: FY04-08

- Approved in June 2003 as part of the approval of the final FY04 CIP
- Baseline FY04-08 capital spending cap: $1.1345 billion. (See Appendix E.)
    - Based on projected capital spending of $1.0233 billion
- Actual spending: $888.5 million
- Spending according to the cap equation: $880.1 million
    - Underspending from the "baseline" cap: $254.4 million (22.4%)
- The Authority did not exceed the overall five-year cap or the allowance of 20% over the individual base year caps.

The Second Five-Year Cap: FY09-13

- Approved in June 2008 as part of the approval process for the final FY09 CIP (See Appendix E.)
- Baseline FY09-13 capital spending cap: $1.1438 billion
    - Based on projected capital spending of: $1.0814 billion
- Actual spending: $825.1 million
    - Lower than the first cap period
    - Spending according to the cap equation: $821.0 million
        - Underspending from the "baseline" cap: $322.8 million (28.2%)

The Third Five-Year Cap: FY14-18

- During the review of the proposed FY13 CIP, the Advisory Board, noting the lower than budgeted spending of the first two periods and observing the progress toward completing the court-ordered CSO Control Program, challenged the Authority to limit the FY14-18 cap to no more than $800 million
- The Authority reshaped its proposed capital program and reconsidered the scheduling for a number of projects, and recommended a new five-year cap below the $800 million challenge

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[5] Adjusted for inflation.

[6] On unawarded construction contracts.

Table 21

FY14-18 Baseline Cap Calculation Versus Updated Spending Projections ($ millions)						
	FY14	FY15	FY16	FY17	FY18	Total FY14-18
Projected Expenditures	$142.5	$147.6	$149.3	$141.8	$136.8	$718.0
Contingency	7.6	9.5	10.1	9.8	9.3	46.1
Inflation on Unawarded Construction	0.8	4.2	8.4	11.1	13.5	37.9
Less: Chicopee Valley Aqueduct Projects	(5.0)	(2.2)	(1.4)	(1.3)	0.4	(10.3)
FY14-18 Baseline Cap	**$145.8**	**$159.1**	**$166.4**	**$161.3**	**$159.1**	**$791.7**
Projected Expenditures	$102.2	$103.6	$95.1	$133.2	$169.9	$604.0
Contingency	0.0	0.0	0.0	0.0	0.0	0.0
Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	0.0	0.0
Less: I/I Program	0.0	(17.5)	(13.6)	(18.4)	(19.1)	(68.6)
Less: Water Loan Program	0.0	1.4	5.3	(8.7)	(11.7)	(13.7)
Less: Chicopee Valley Aqueduct Projects	(5.6)	(1.2)	(0.4)	(0.1)	(0.6)	(7.9)
FY18 Proposed Subtotal	**$96.6**	**$86.3**	**$86.4**	**$106.0**	**$138.5**	**$513.0**
Change ($)	(49.2)	(72.8)	(80.0)	(55.3)	(20.6)	(277.9)
Change (%)	-33.7%	-45.8%	-48.1%	-34.3%	-12.9%	-35.1%

- The FY14-18 baseline cap was approved in June 2013 as part of the approval process for the final FY14 CIP
- Baseline FY14-18 capital spending cap: $791.7 million
  - Based on projected capital spending of: $718.0 million

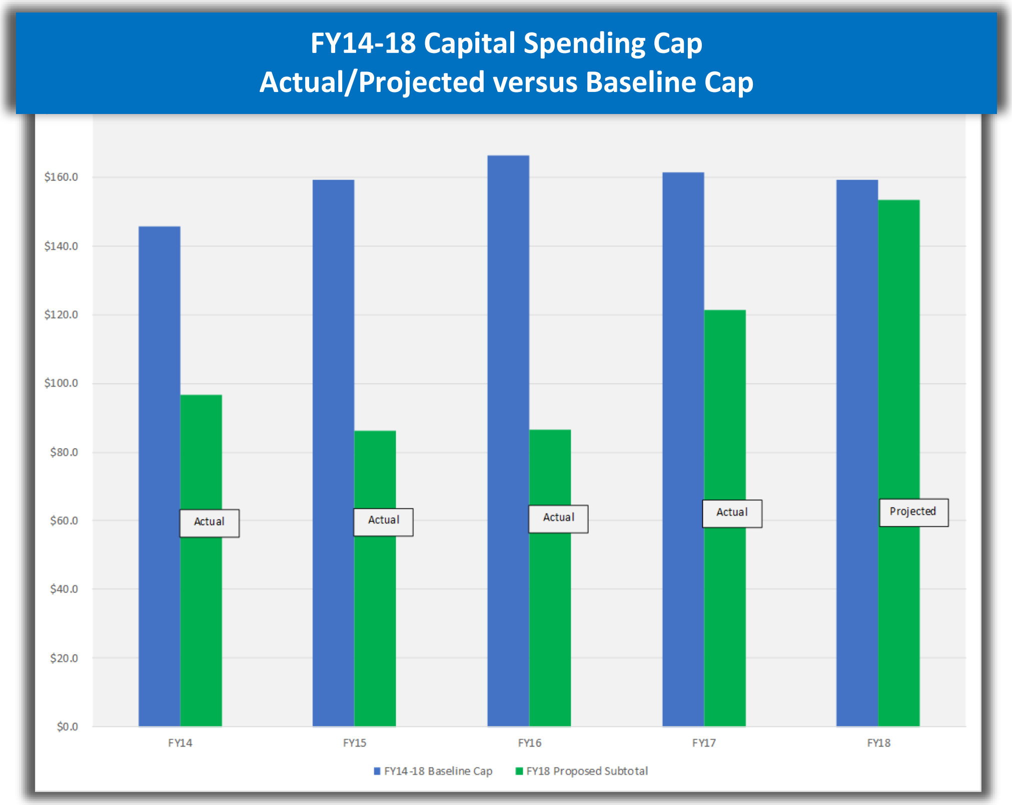


Figure 7

Proposed Capital Spending Cap FY19-23

Table 22

Proposed FY19-23 Baseline Cap Calculation
($ millions)

	FY19	FY20	FY21	FY22	FY23	Total FY19-23
Projected Expenditures	$207.2	$285.8	$290.8	$258.0	$192.3	$1,234.1
Contingency	12.5	17.2	17.5	15.9	11.3	74.2
Inflation on Unawarded Construction	0.0	8.2	15.1	18.9	15.7	58.0
Less: I/I Program	(14.0)	(23.2)	(27.2)	(22.4)	(25.0)	(111.8)
Less: Water Loan Program	(13.3)	(14.0)	(10.7)	(8.7)	(5.5)	(52.3)
Less: Chicopee Valley Aqueduct Projects	0.0	0.0	0.0	(0.3)	(1.0)	(1.3)
FY18 Proposed Subtotal	**$192.4**	**$274.0**	**$285.4**	**$261.4**	**$187.7**	**$1,201.0**

The Authority has proposed a capital spending cap of $1.2 billion for the FY19-23 period. As Figure 8 shows, this would be the third cap to top the $1 billion mark and would be the largest capital spending cap in the MWRA's history. The Advisory Board focused much of our review on understanding the reasons for the increase from the $800 million cap in the FY14-18 period to the proposed $1.2 billion.

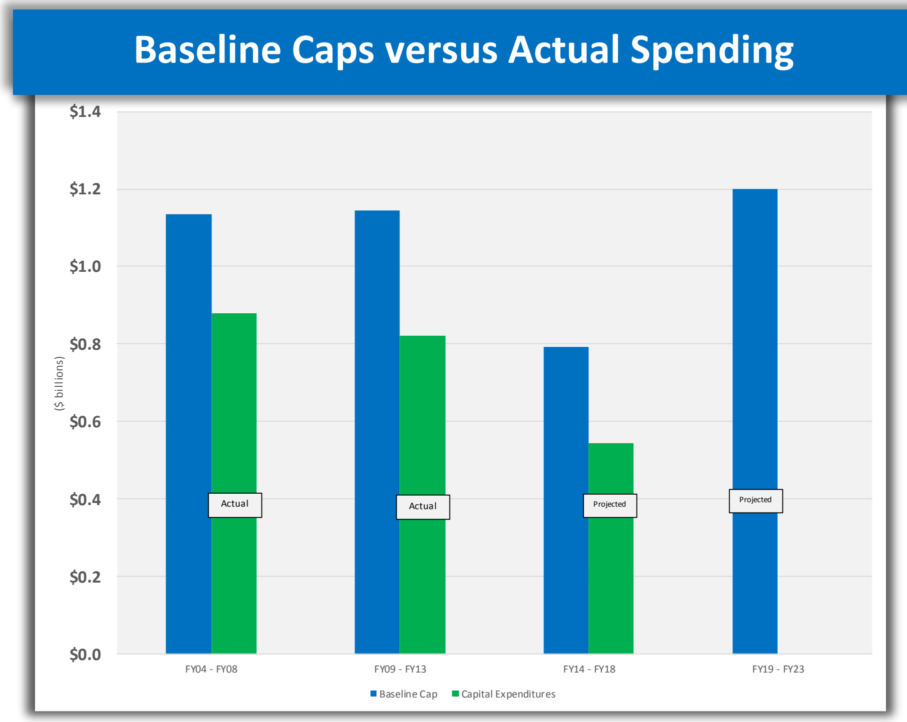


Figure 8

Authority staff maintained that the projects being requested were the right projects for this period, and further that they would have adequate resources – staffing, technical assistance contracts, etc. – to spend at this increased level. One of the primary reasons given for the increase was the size of many of the projects within the cap period.

There are fifteen projects in FY19-23 with spending over $20 million. Together, these fifteen projects make up almost two-thirds of spending for the entire cap period.[7] Figure 11 demonstrates this. MWRA's CIP presents both Deer Island and Interception and Pumping (I&P) Asset Protection as individual projects, but they are actually made up of

[7] Capital spending cap calculation excludes community assistance programs and CVA community projects. All comparisons in this narrative are based upon the cap calculation and spending on projects included.

several sub-projects, which we include in the fifteen projects with over $20 million of spending in FY19-23. In Figure 10 and Figure 11 we further break down the Deer Island Top Projects and I&P Top Projects for comparison.

There is no doubt that there are major projects ahead for the five-year period proposed. One project alone – Deer Island Clarifier Rehabilitation – makes up 13% of cap spending; however, the Advisory Board remains concerned with the increased level of spending proposed. The Authority has a trend of underspending from the previous three caps (Figure 8), although that has begun to tighten somewhat in the current fiscal year. The Advisory Board agrees that an increase from the $800 million level set from FY14-18 is warranted given the size of the projects proposed but believes the Authority should still reduce its cap from the $1.2 billion level.

The Advisory Board therefore recommends that the Authority reduce the FY19-23 capital spending cap from $1.2 billion to no greater than $950 million.

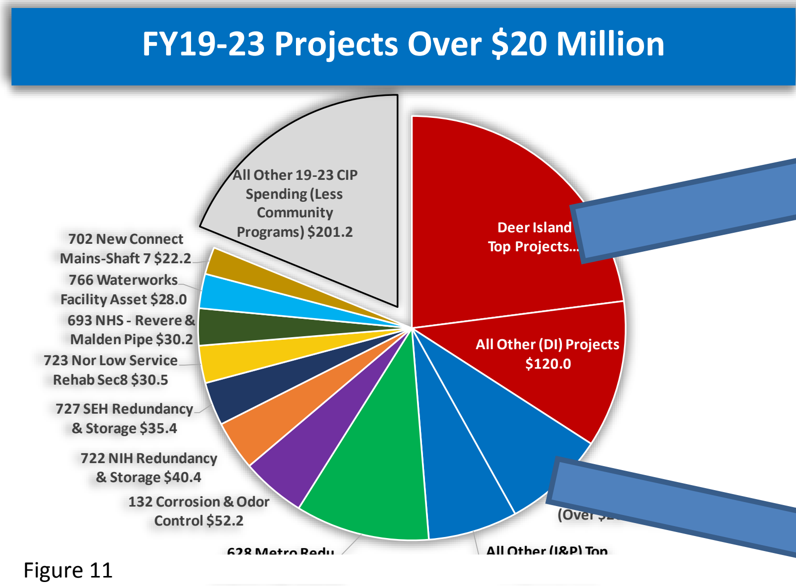


Figure 11

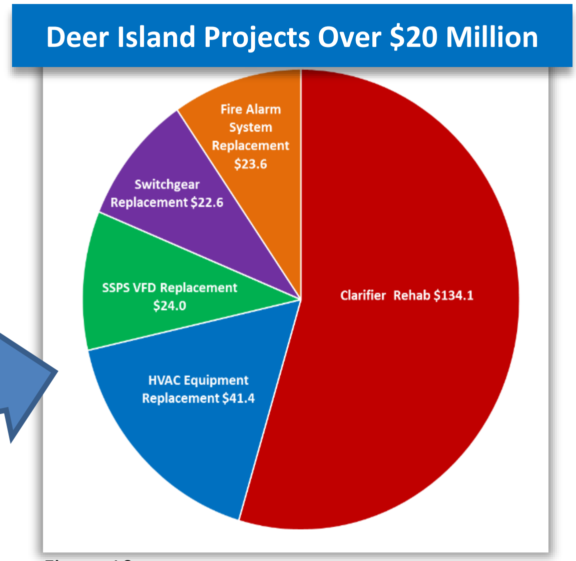


Figure 10

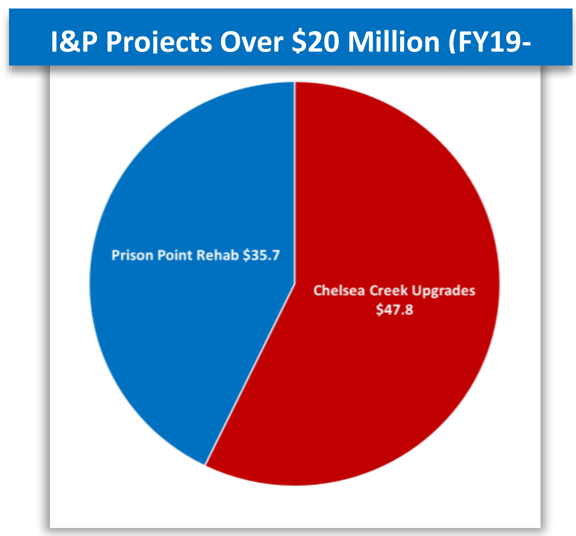


Figure 9

Proposed FY19 Current Expense Budget

Proposed FY19 CEB Highlights

Table 23

MWRA Current Expense Budget
($ millions)

	FY18 Budget	FY19 Proposed	$ Change	% Change
Expenses				
Direct Expenses	232.6	238.6	6.0	2.6%
Indirect Expenses	38.9	45.4	6.6	16.9%
Capital Financing	472.2	489.2	17.0	3.6%
Subtotal Expenses	***$743.6***	***$773.2***	***$29.6***	***4.0%***
Offsets				
Bond Redemption	0.0	0.0	0.0	-
Debt Service Assistance	0.0	0.0	0.0	-
Subtotal Offsets	***$0.0***	***$0.0***	***$0.0***	-
Net Expenses	**$743.6**	**$773.2**	**$29.6**	**4.0%**
Revenues				
Other User Charges	9.0	9.5	0.5	5.1%
Other Revenue	7.4	6.2	(1.1)	-15.4%
Rate Stabilization	0.0	0.0	0.0	-
Investment Income	10.2	12.5	2.3	22.1%
Subtotal Non-Rate Revenue	***$26.6***	***$28.2***	***$1.6***	***5.9%***
Rate Revenue	***$717.1***	***$745.1***	***$28.0***	***3.91%***
Total Revenue and Income	**$743.6**	**$773.2**	**$29.6**	**4.0%**

$7.17 million ≈ 1% of FY18 rate revenue

- MWRA's total budget increases 4.0%, but wholesale rate revenue increases 3.91%

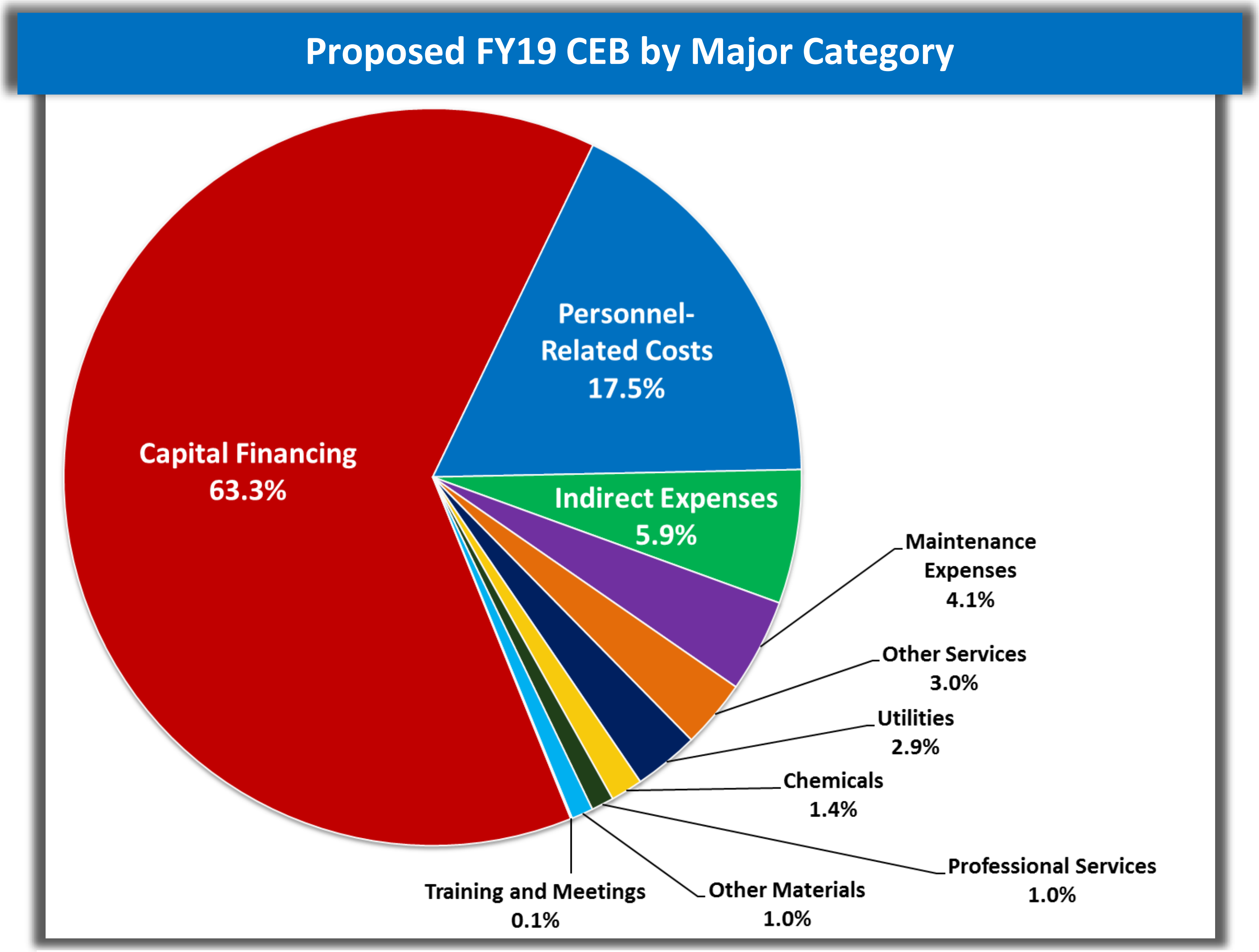


Figure 12

Direct Expenses

- Direct expenses: $238.6 million
  - 30.9% of proposed CEB
- Personnel-related costs: $135.5 million
  - Nearly 57% of all direct expenses and include:
    - Wages and salaries
    - Overtime
    - Fringe benefits
    - Workers' compensation
- Maintenance: $31.6 million
  - Just over 13% of direct expenses
  - Second largest category
  - Larger maintenance projects are part of the capital budget.
- Utilities: $22.0 million
  - Nearly 9.2% of all direct expenses
  - Electricity: $16.5 million (almost 75% of utilities)
  - Essentially level funded from FY18

- Other services: $23.2 million
    - 9.7% of direct expenses
    - Sludge pelletization at the Fore River plant increased by 3.7%
- Chemicals expense: Just under $10.9 million
    - 4.5% of direct expenses
- Remaining direct expenses: $15.5 million
    - 6.5% of direct expenses and includes:
        - Professional services ($87.6 million)
        - Other materials ($7.4 million)
        - Training and meetings ($455.8 thousand)

Indirect Expenses

- Total: $45.4 million
    - Makes up 5.9% of total expenses
- Largest components are:
    - Watershed-related expenses (just under $26 million)
    - Pension fund deposit ($7.1 million)
        - Due to lower than anticipated pension returns, this line has increased by 117% from FY18
    - Other Post-Employment Benefits ($5.5 million) (See Indirects Chapter)
        - The current approach is to make an OPEB deposit equal to 50% of the Actuarial Calculated Contribution (ACC).

Capital Financing Expense

- Total: $489.2 million
    - Makes up 63.3% of all expenses
- Debt service: $454.5 million
    - Makes up 92.9% of capital financing
    - Includes principal and interest payments on:
        - State Revolving Fund (SRF) borrowings
        - Senior debt
        - Subordinate debt

Remaining capital financing expenses: $34.7 million

- Supports:
    - Water pipeline commercial paper program ($4.75 million)
    - Current revenue for the capital program ($14.2 million)
    - Capital lease payments for the debt portion of the Chelsea facility ($3.2 million)

“Delta Report” Total MWRA Spending Increases $29.6 Million

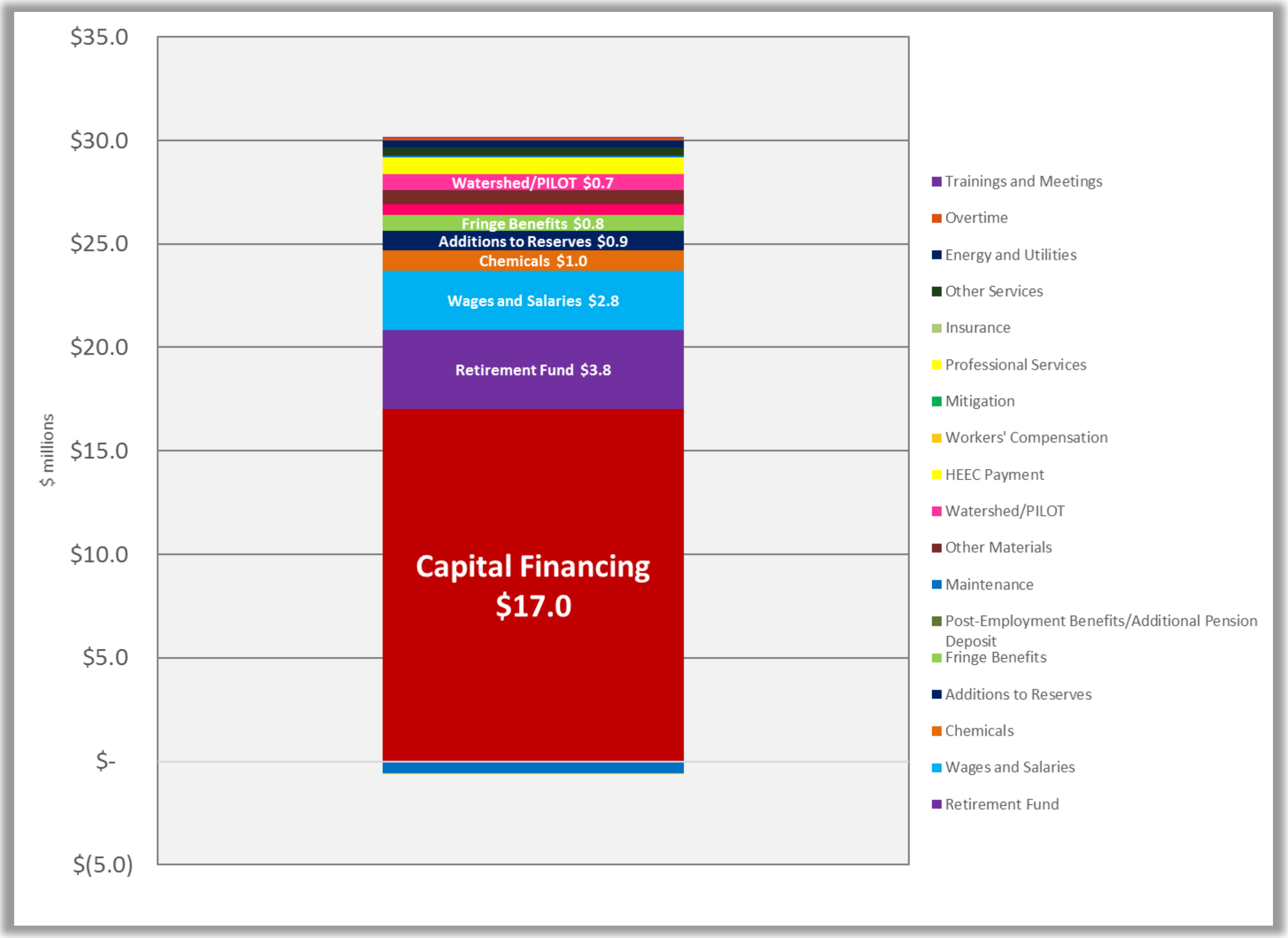


Figure 13

- Capital Financing: +$17.0 million
    - Largest increase
- Retirement Fund: +$3.8 million
    - Second largest increase
- Decreases partially offsetting total “delta” include:
    - Maintenance (-$563 thousand)

Revenues

- Rate revenue requirement: $745.1 million
    - Increase from FY18: $28.0 million (3.9%)
    - Makes up over 96.4% of total revenue
    - Raised through wholesale water and sewer assessments to communities
- Non-rate revenue: $28.2 million
    - Increase from FY18: $1.6 million
    - Makes up 3.6% of total revenue
    - Sources include:
        - Investment income

  - Other revenue
  - Other user charges
- FY11 increase of 1.49% ($8.4 million) was the lowest in the previous 15 years, since 1996 when the Authority received $31.5 million in state debt service assistance.

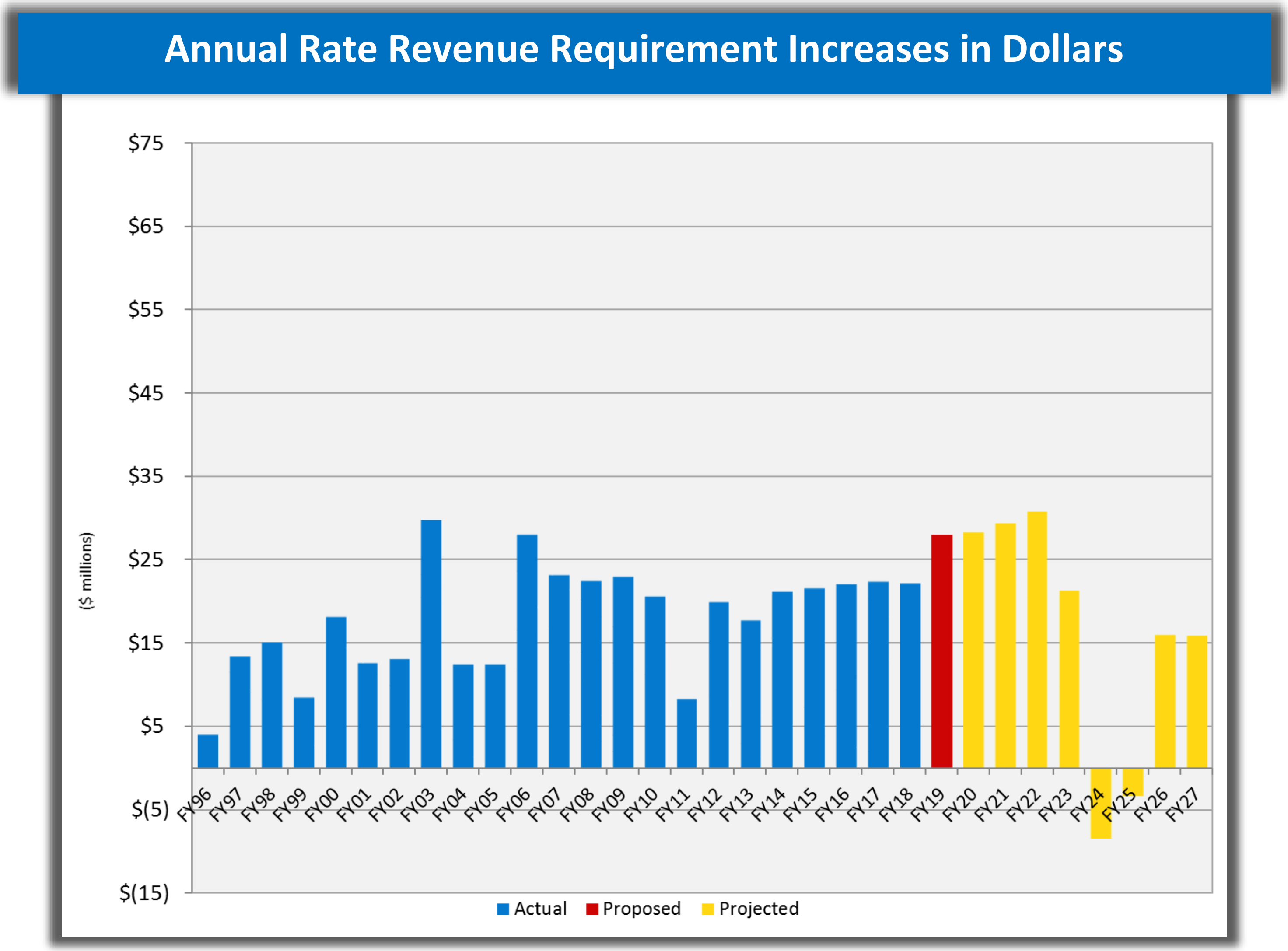


Figure 14

- Rates are currently projected to increase by over $100 million for the next five years. (See Figure 14.)
- The rate increases, lower than previous projections, reflect a multi-year rates management strategy to keep rates at sustainable levels during these continued challenging times.
- Defeasance: the prepayment of a portion of a future year's debt service using current-year surplus funds.
  - This tool has been used consistently and strategically
- Proposed FY10 CEB was the first proposed budget to assume benefits of a planned defeasance transaction.
- Beginning in FY17, the Authority began strategically prepaying debt service to help manage future rates
- Future rate projections include $32.5 million in optional debt payments over the next four years
- This assumption allows proposal of lower rate revenue increases than earlier projected.
- Total defeased debt between 2006 and projected FY18 defeasance: $538.2 million. (See Figure 21.)

Annual Rate Revenue Requirement Increases Over Time

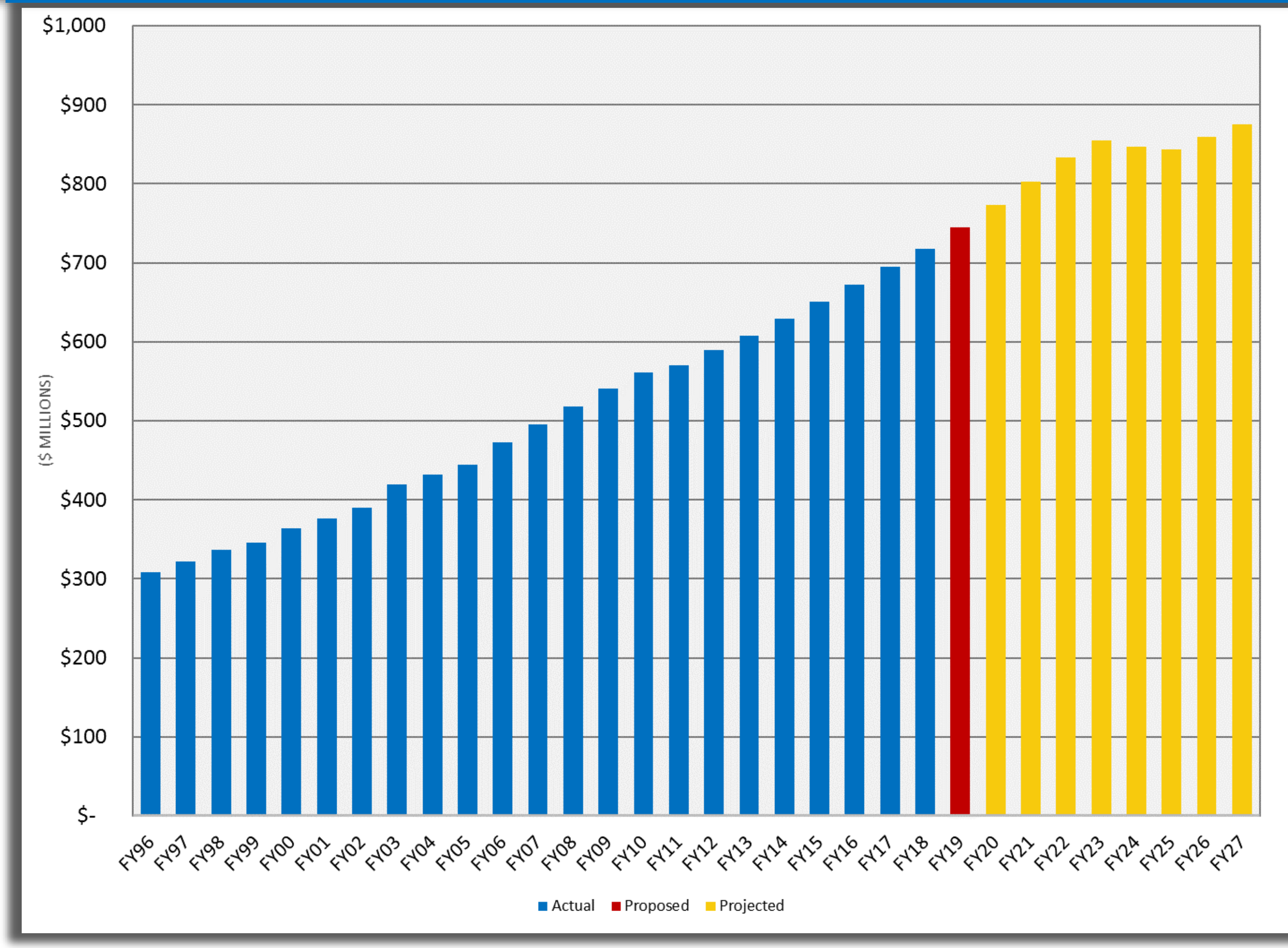


Figure 15

Proposed FY19 Current Expense Recommendation

The Advisory Board has recommended or identified about $6 million in line item reductions, some increases, as well as some transfers between line items. Consistent with its practice in recent years, Advisory Board staff worked with Authority staff to incorporate updated assumptions into the budget review. Authority staff also identified some line item and revenue reductions and increases as part of this process, which we'll detail in our review. (See Appendix C.)

Therefore, the Advisory Board recommends reducing the FY19 Rate Revenue Requirement by $6,010,531 resulting in a combined wholesale assessment increase of 3.07%

Major Categories of Spending

Detailed discussion of the major categories of spending follows in order of highest to lowest level of spending:

Table 24

Proposed FY19 CEB Major Categories of Spending	
$ millions	
Capital Financing	$489.2
Personnel-Related Costs	135.5
Indirect Expenses	45.4
Maintenance Expenses	31.6
Other Services	23.2
Utilities	22.0
Chemicals	10.9
Professional Services	7.6
Other Materials	7.4
Training and Meetings	0.5
TOTAL EXPENSES	**$773.2**
REVENUE	**$773.2**

Capital Financing

$ millions

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Total Senior Debt Service	**$264.56**	**$273.13**	**$8.57**	**3.2%**
Outstanding	261.06	263.03	1.97	0.8%
New FY18/FY19	3.50	10.10	6.60	188.6%
Potential Defeasance/Restructuring	0.00	0.00	0.00	-
Fixed rate debt service, existing, and new borrowings				
Total Subordinate Debt Service	**85.44**	**92.03**	**6.59**	**7.7%**
Outstanding	85.44	92.03	6.59	7.7%
New FY18/FY19	0.00	0.00	0.00	-
Potential Defeasance/Restructuring	0.00	0.00	0.00	-
Variable rate debt service: 3.25% interest rate assumption				
Total SRF Debt Service	**84.93**	**89.38**	**4.45**	**5.2%**
Outstanding	80.64	85.09	4.45	5.5%
New FY18/FY19	4.29	4.29	0.00	-0.1%
Low-interest loans from the Commonwealth. 2.0% interest rate (Water); 2.5% (Sewer)				
TOTAL DEBT SERVICE	**434.94**	**454.54**	**19.60**	**4.5%**
Water Pipeline Commercial Paper	**3.79**	**4.75**	**0.96**	**25.2%**
Debt service supporting $25 million/year for the Local Water Pipeline Improvement and Local Water System Assistance Loan Programs				
Current Revenue/Capital	**13.20**	**14.20**	**1.00**	**7.6%**
Amount of current revenue used to fund ongoing capital projects and to meet coverage requirements				
Capital Lease	**3.22**	**3.22**	**0.00**	**0.0%**
Chelsea facility lease payment				
Harbor Cable Prepayment	**6.53**	**0.00**	**0.00**	**0.0%**
HEEC cable capacity reserve fund (one-time fund established to mitigate cross harbor cable replacement costs)				
Debt Prepayment	**10.90**	**12.50**	**0.00**	**0.0%**
Optional debt prepayment for the purpose of mitigating future rates				
TOTAL OTHER CAPITAL EXPENSES	**37.64**	**34.67**	**-2.98**	**-7.9%**
Bond Redemption	**0.00**	**0.00**	**0.00**	**-**
Bond Redemption funds used to reduce capital financing expense				
Debt Service Assistance (offset)	**-0.39**	**0.00**	**0.39**	**-100.0%**
The state-wide program providing assistance with wastewater debt service is not assumed in the Commonwealth's FY18 budget.				
TOTAL CAPITAL FINANCING EXPENSES	**$472.19**	**$489.21**	**$17.02**	**3.6%**

Table 25

Other Highlights

- Outstanding principal: $5.0 billion[8]
- Planned FY19 borrowings:
  - MWRA: $125 Million
  - SRF: $30.0 million sewer and $20.0 million water, total of $50 million
- Proposed FY19 CEB also includes full year debt service for new borrowings during FY18

[8] Through June 1, 2018

"Delta Report" Capital Financing Increases $17 Million

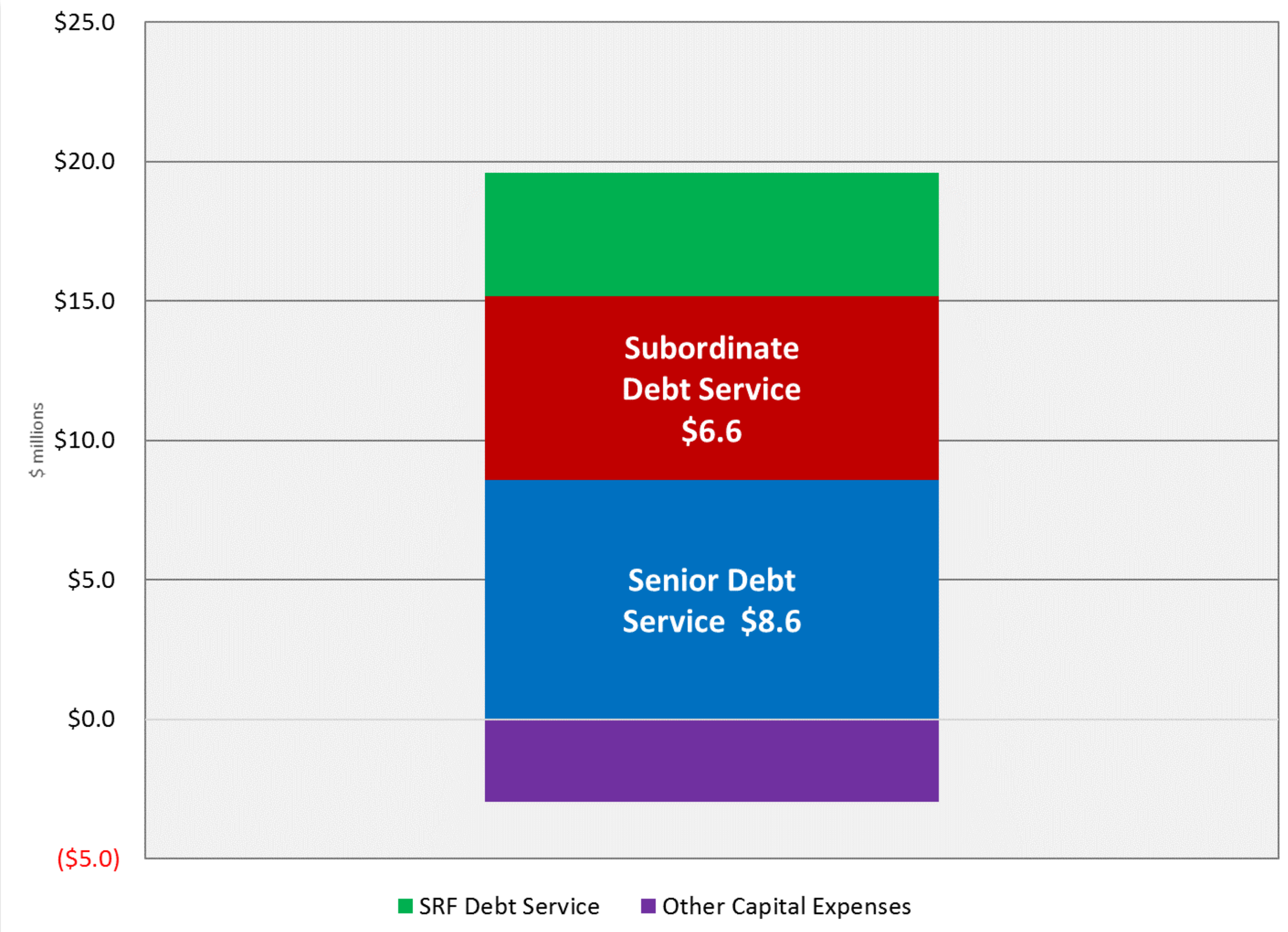


Figure 16

- The Authority relies heavily on debt financing to fund its capital program
- The Authority has spent $8.3 billion on its capital improvement program[9]
- For FY19, capital financing expense as a percent of all expenses is 63.3% (See Figure 17)

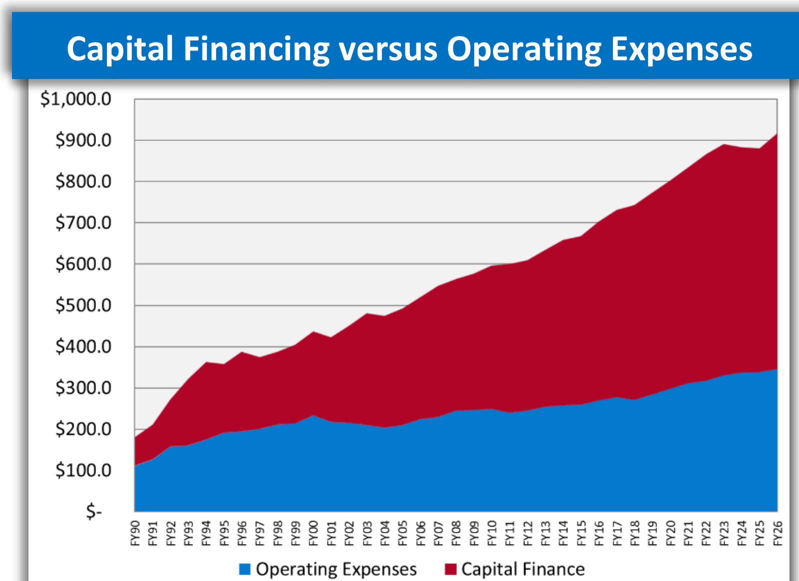


Figure 17

[9] Through FY17

- Outstanding principal borrowed totals $5.0 billion[10] and includes four categories:
    - State Revolving Fund (SRF)
    - Pure Variable (subordinate debt)
    - Swap Notional (subordinate debt)
    - Senior Debt
- Commercial paper (CP) outstanding: $128 million
    - Including CP, total outstanding principal = $5.0 billion
- Outstanding principal is declining and is $200 million less than the prior year

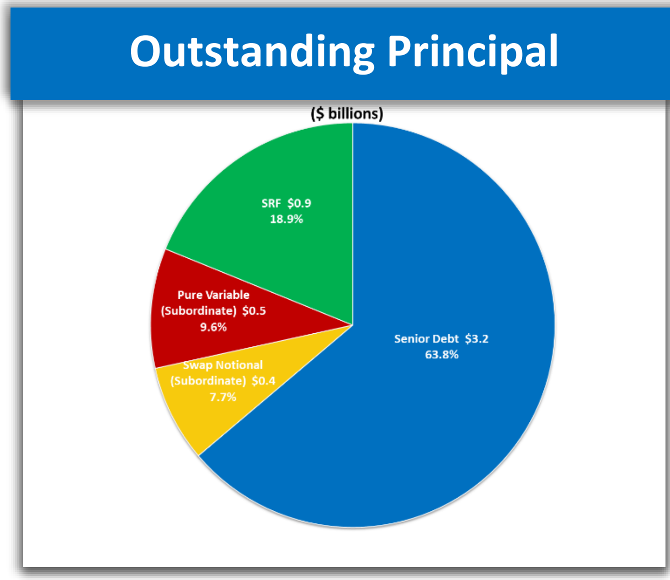


Figure 18

Debt Service on Senior Debt

- FY19 debt service on senior debt is $273.1 million including:
- $6.6 million for full first-year costs of planned spring 2018 borrowing of $100 million
    - $3.5 million for partial year debt service on new borrowing of $125 million next spring 2019
    - $1.1 million in estimated reduced debt service in FY18 from projected 2018 defeasance transaction

Debt Service on Subordinate MWRA Debt

- FY19 debt service on subordinate debt: $92.0 million
- Variable rate debt interest rate assumption: 3.5%
    - 0.25% higher than the rate in FY18
    - Based on the interest rate for the daily and weekly series; liquidity fees for the Standby Bond Purchase Agreement, Letter of Credit, and Direct Purchase providers; and remarketing fees
    - Federal Reserve Board has indicated that rates may increase in the coming fiscal year, so this conservative rate assumption will continue to shield the Authority from risk
- One factor rating agencies consider when updating the Authority's bond rating is how much variable rate debt exposure the Authority has
- Outstanding variable rate debt: $831.0 million
    - Makes up 17.3% of all outstanding debt
    - Percentage has been declining over the last several years: just five years earlier it was 21% of all outstanding debt

The Advisory Board recommends reducing the optional debt pre-payment by $1.6 million to level-fund this line item from FY18.

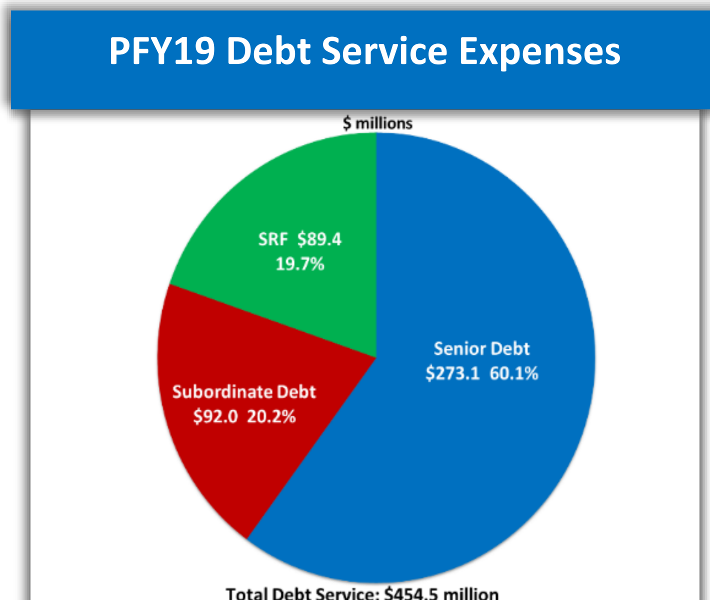


Figure 19

[10] As of June 1, 2018

Policy Point

Interest Rate Assumptions

"Not Quite Yet"

The Authority has greatly benefited from the historically low interest rates on variable rate debt over the past decade. For years, the MWRA has used variable rate debt (VRD) as a portion of its overall debt portfolio and has saved significant amounts by so doing. As the economic climate shows signs of potential rate increases, however, the MWRA is challenged with budgeting to the correct rate. Since the MWRA VRD interest rate was modified to 3.25%, the actual interest rates have consistently been lower, yielding significant levels of budgeting surpluses. These surpluses became a core component of the defeasance account strategy (see Figure 20).

This defeasance account strategy was a landmark agreement to utilize surplus dollars from capital financing items to defease or prepay debt. For the Advisory Board, it was a victory for ratepayers that funds raised from them for capital financing expenses would ultimately be spent for this purpose rather than potentially redirected toward something else. While it approved dedicating these surplus funds, the Advisory Board viewed the high levels of underspending as an

Variable Rate Debt Interest Rates Historical Data

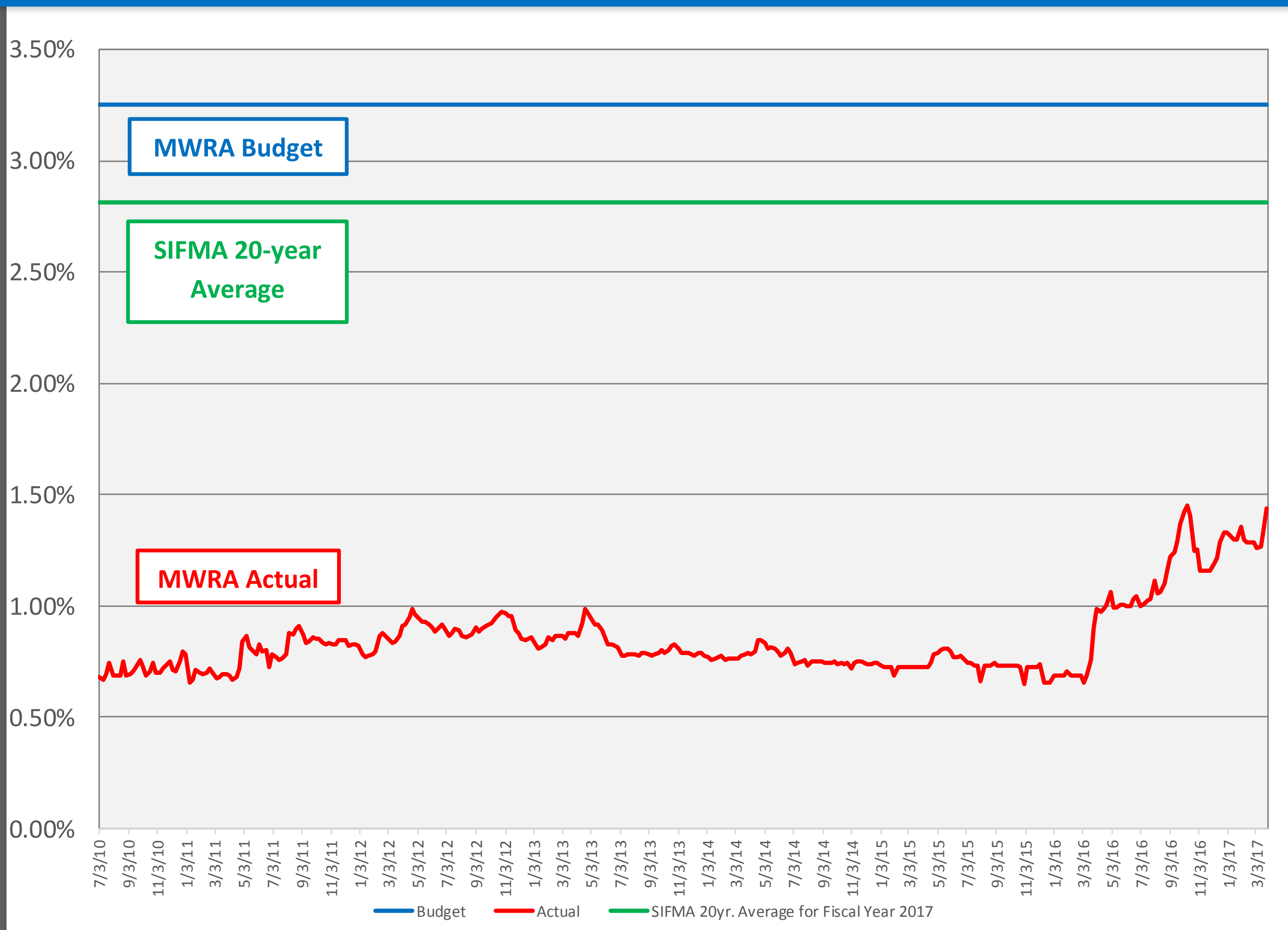


Figure 20

unexpected bonus caused by the historically low interest rates. The Advisory Board expected the unusually high levels of surplus funds would eventually decrease once interest rates came up, as they are today.

Figure 20 shows these recent increases in interest rates, beginning around April 2016. After seven years of historic lows, the Federal Reserve began raising rates in December 2015, with an additional two increases by March of 2017. In response to this, the Authority had proposed increasing its VRD interest rate assumptions 25 basis points from 3.25% to 3.5% in FY18. The Advisory Board recommended that the MWRA maintain assumptions at 3.25% as federal increases were unlikely to surpass this level in FY18. To date, even with federal rates continuing to rise, the 3.25% Authority assumption is still higher than the actuals. Despite this, the Authority has again proposed an assumed rate increase of 25 basis points, resulting in a $1 million cost increase in the proposed FY19 budget.

While economic forecasts show that interest rates are on the rise, the Advisory Board believes that a 25-basis point increase on VRD interest is overly conservative. While defeasance is always beneficial to the ratepayers, it cannot be simultaneously burdensome to them.

Therefore, the Advisory Board recommends reducing the variable rate debt interest rate assumption to 3.25%, and the variable rate debt line item by $1 million to reflect this change.

SRF Borrowings

- FY19 debt service on SRF borrowings: $89.4 million
    - $8.6 million to support issuances of $50 million of loans during 2018 and $50 million in 2019
    - These amounts may be updated in the final FY19 CEB
- Outstanding SRF debt: $942.0 million
    - 18.9% of total outstanding debt[11]

Bond Defeasance and Refunding

- Proposed FY19 CEB assumes a defeasance transaction with a principal amount of $25.9 million
    - $15 million from the projected FY18 surplus included in the FY19 CEB
    - Total estimated benefit in future years: $27.7 million
        - Benefits are in FY20 through FY22

[11] As of December 31, 2017

- Since 2006, through the proposed FY19 defeasance, MWRA will have defeased $538.2 million for targeted debt service reductions over multiple years. (See Figure 21.)

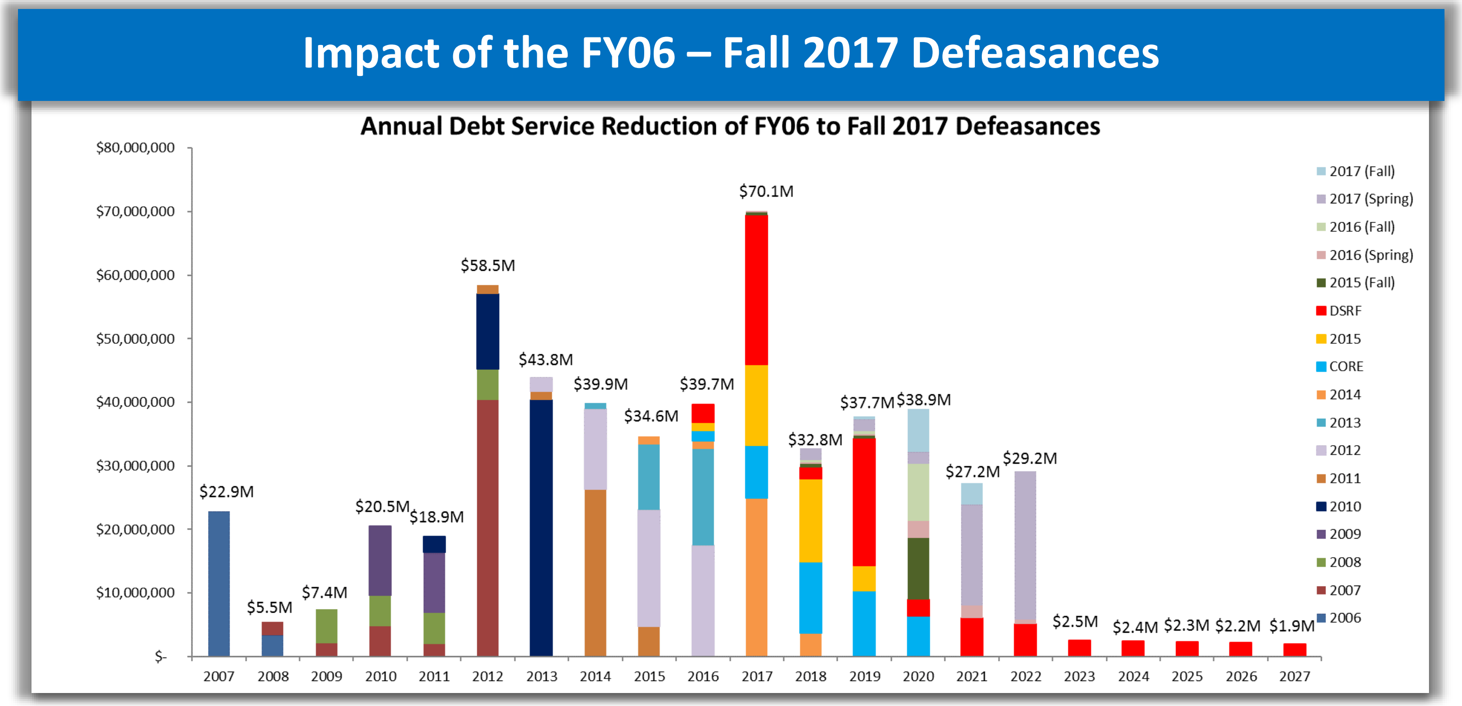


Figure 21

- The Authority continues to look for opportunities for refunding and refinancing to reduce projected debt service
- The Board has authorized the continuation of the defeasance account to receive surplus funds raised for capital financing expenses to manage future rates. The account ensures that these funds are used in a manner consistent with the purpose for which they were budgeted and raised from the ratepayers.

The Advisory Board supports the continued use of the defeasance account strategy, which clearly identifies a use of variable rate debt service savings that is consistent with the original intended use of the funds that were raised.

Other Components of Capital Financing Expense

- Water Pipeline Commercial Paper: $4.8 million
  - Interest payments on commercial paper borrowings for:
  - Local Pipeline Assistance Program (LPAP)
  - Local Water System Assistance Program (LWSAP)
  - Assumptions include:
    - 3.25% interest rate
    - $128.0 million balance of commercial paper outstanding
- Capital Lease Payment: $3.2 million
- Relating to capital costs of Chelsea administration and maintenance facilities; flat annual cost
- The amount has remained the same since 2002
- Annual lease costs, insurance and taxes are included in the “Other Services” section
- Current revenue for the capital program: $14.2 million
- The FY18 budget was $13.2 million; the FY17 budget was $12.2 million

Debt Service Offsets

- Debt Service Assistance funds from the Commonwealth have been a critical tool in managing sewer (and some water) revenue increases for MWRA communities
    - Proposed FY19 budget assumes $0 funding
    - Earlier, the Administration confirmed the funding of $1.1 million for the statewide capital debt service assistance program in the FY18 budget

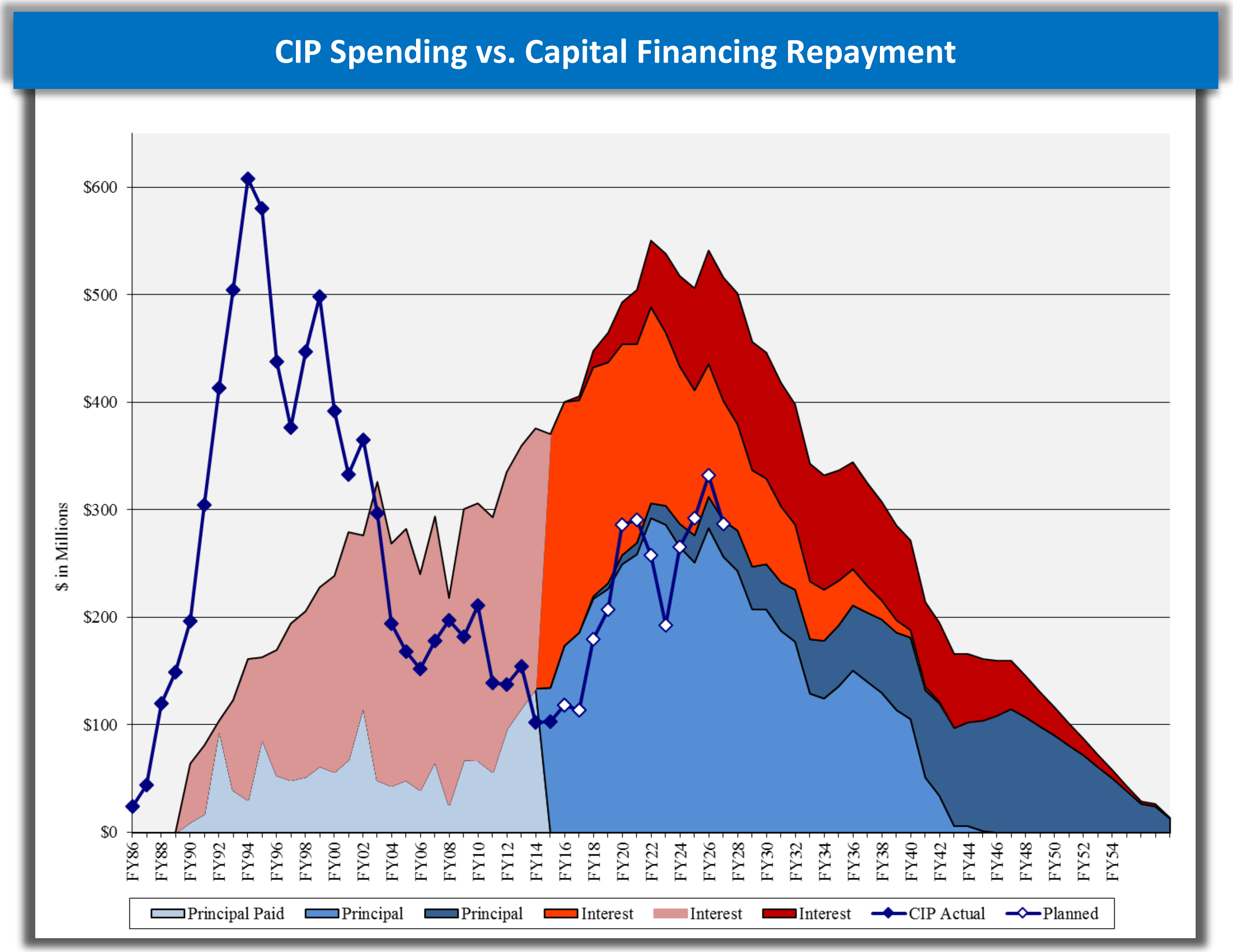


Figure 22

Policy Point

Alternative Capital Financing

"The Right Financing for the Right Project"

Taxable Bonds

Even with the construction of Deer Island and the MetroWest Tunnel behind us, the Authority still has large, complex projects ahead of it. These unique projects raise unique challenges for funding. Deviation from traditional practices of tax-exempt bonds and shorter term debt may be necessary for the Authority and beneficial to the ratepayers.

Having a large Capital Improvement Program, and an excellent credit rating, the MWRA's tax-exempt bonds are attractive to many investors. The tax-exempt status generally allows investors to take in a maximum value. These bonds are met with some limitations, however, when it comes to the kind of projects they can fund. For a bond to be tax-exempt it undergoes two evaluations, one for private use and the other for private payment. In short, the tax-exempt entities, or its partners, may not yield profit from the projects associated with the bonds. MWRA projects generally fit into these tax-free categories automatically. The use of taxable bonds has not been a particular need for the Authority, but there are some unique challenges ahead that could benefit from other methods of funding.

The greatest priority with all MWRA borrowing is long-term rates management. The goal is to deliver sustainable and predictable rates to ratepayers, being mindful of variable generational equity and total outstanding debt. The ratepayers should not be burdened with unnecessary debt or unattainable rate costs either. With this in mind, the Authority has upcoming projects that could potentially qualify for taxable bond status. These include the implementation of the Lead Service Line Replacement Loan Program as well as possible purchase of a portion of a private railroad near the Wachusett Reservoir. Both of these projects involve partnership with parties that could possibly fall under the private use and private partnership concepts mentioned earlier. While the LLP program is already in place, its current funding mechanism is through the current revenue for capital projects (Pay-Go) fund. The use of pay-go has a benefit of interest-free payments; this is an attractive payment method on projects that have short lifespans. Its disadvantage is its immediate impact on utility rates. Additionally, pay-go funds in the immediate fiscal years are committed towards the cross-harbor cable replacement project. With changes in the political and economic environment, lower tax rates make some of the financial differences between taxable and tax-exempt bonds less competitive. Additionally, the increased use of pay-go, and therefore the unnecessary and burdensome rate hikes on communities, cannot be an option. The Advisory Board believes that the MWRA should analyze the current market to see if there would be a benefit to the ratepayers in the use of taxable bonds in these cases. Additionally, taxable bonds may make the task of working with private organizations after the completion of these projects less complex.

The Advisory Board recommends that the Authority explore the potential financial gains from using taxable bonds on appropriate capital projects, such as the Lead Loan Program and the purchase of the railroad near Wachusett Reservoir.

40-Year Debt

Another upcoming project that could benefit ratepayers with an alternative funding practice is the Metropolitan Redundancy Tunnel. The tunnel is not ideally suited for taxable bonds, and its 100-year lifespan is not a great fit for pay-go, but the length of borrowing for the project has potential for positively impacting ratepayers. Over the years the Authority has taken on a variety of loan structures to fund projects, both short- and long-term debt. The use of longer term debt has been less frequent in recent years. The long lifespan of the tunnel means that it will benefit multiple generations of ratepayers. Spreading out the length of its associated debt would mean all generations benefiting from the project would pay for it. Implementation of a 40-year debt structure to finance the tunnel or other qualifying projects would bring relief to annual utility rates on communities and still yield a significant amount of positive equity in the project after it has been paid off.

The Advisory Board recommends that the Authority adopt a long-term, 40-year debt structure to fund the Metropolitan Redundancy Tunnel and other projects with long useful lives.

MassWorks Grants

The final alternative financing tool to mention are MassWorks Grants. The Advisory Board and MWRA staff are hoping to secure $25 million in MassWorks grants to dedicate to financing capital costs for communities interested in joining the MWRA waterworks system.

The Advisory Board expects to continue working with MWRA staff and MassWorks to dedicate grant funding for communities looking to join the MWRA waterworks system.

Personnel Expenses

Line Item/Description	Final FY18	Proposed FY19	Δ ($s)	Δ (%)
Regular Pay	$102,518,999	$105,511,115	$2,992,116	2.9%
Regular wages and salaries for full- and part-time employees.				
Other Pay	1,767,371	1,607,602	-159,769	-9.0%
Includes shift differential, holiday pay, temporary employees, interns/co-ops, and stand by pay.				
Wages and Salaries Subtotal	104,286,370	107,118,717	2,832,347	2.7%
Fringe Benefits	20,997,975	21,774,617	776,642	3.7%
Includes health insurance, dental insurance, Medicare, and all other fringe benefits.				
Overtime	4,110,637	4,247,557	136,920	3.3%
For planned maintenance, emergency, and coverage.				
Workers' Compensation	2,322,980	2,322,609	-371	-0.0%
Includes compensation payments, medical payments, and other related costs.				
TOTAL PERSONNEL EXPENSES	**$131,717,962**	**$135,463,500**	**$3,745,538**	**2.8%**

Table 26

Other Highlights

- Wages and salaries expense include an estimate of FY19 COLA increases.
- Average funded staffing level: 1,150, plus five budgeted for long-term water redundancy project
- FY18 budgeted level: 1,150
- Fringe benefits expense increased mainly due to estimated increases for the GIC; calculations are based on current enrollment.
- More and more employees are opting for individual health insurance plans rather than family plans
- Workers' compensation expense is based on a three-year average of actual spending.

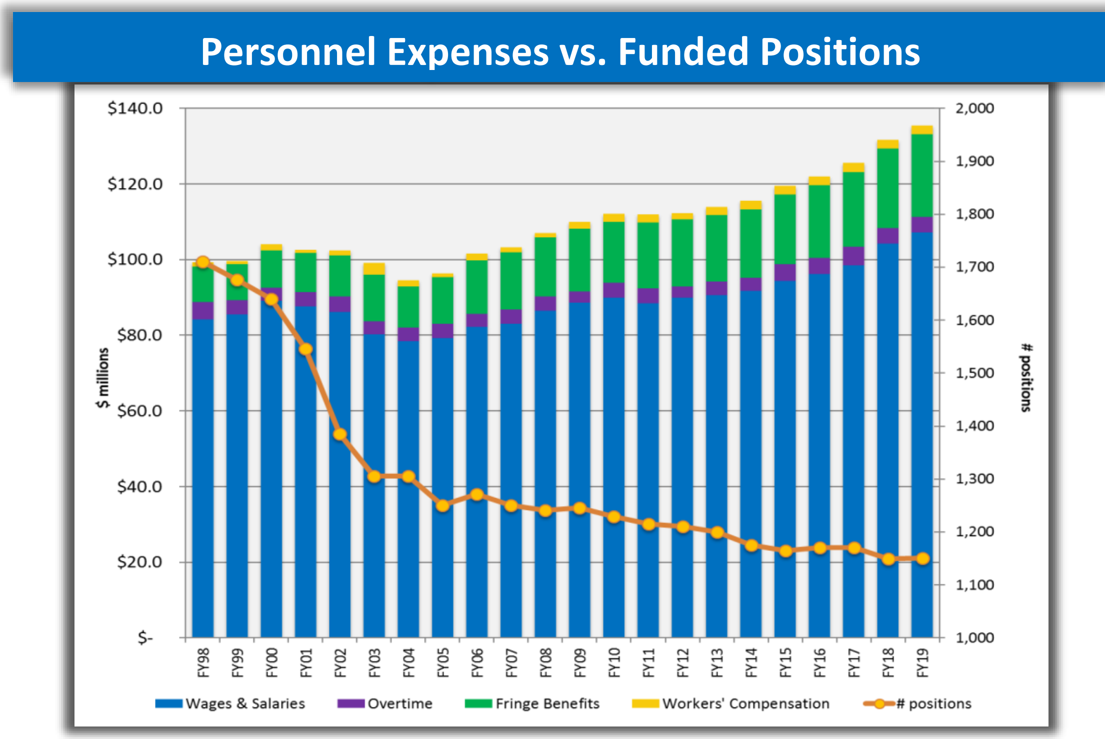


Figure 23

"Delta Report" Personnel Expenses Increase $3.7 Million

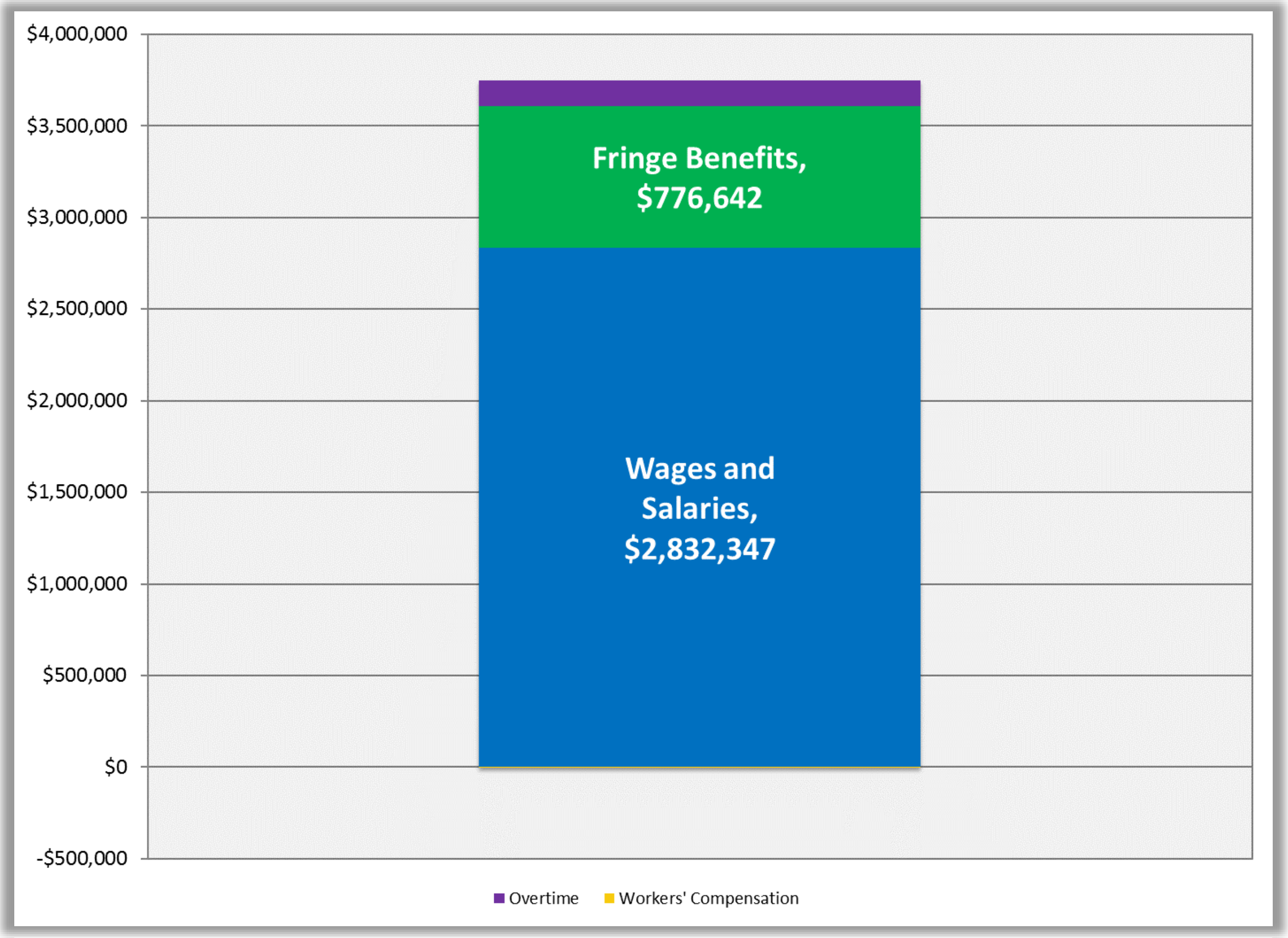


Figure 24

- Staffing levels have decreased by over one-third since 1997
- Proposed FY19 = 1,150 FTEs plus 5 for water redundancy project; FY18 = 1,150 FTEs
- Total Reduction: 607 positions
- February 2018 staffing level: 1,130 FTEs
- New hires tend to begin at lower pay-rates than the incumbents, helping to contain costs
- New hires pay a higher percent of health insurance premiums, reducing fringe benefits costs

Wages and Salaries

- Increase from FY18: +$2.8 million (2.7%)
- One union contract is still being negotiated and may impact the final FY19

The Advisory Board expects the MWRA to propose an increase of $113,305 in the "wages and salaries" category of expenses in its final FY19 CEB.

Due to the lag time inherent in backfilling vacancies, the Advisory Board recommends that the Authority adjusts its attrition/vacancy rate assumptions upward by $950,000 (includes associated fringe benefits).

- To put this recommendation in perspective: through April 2018, the Authority was underspent in personnel expenses by about $3.9 million.
- The temporary positions to support the Lead Loan Program will continue through FY19, as schools and day cares in communities continue to show interest in testing.

The Advisory Board supports continued funding for proposed temporary staffing related to the lead program to assist communities.

Fringe Benefits

- Fringe benefits make up 16.1% of total Personnel-related expenses.

Based on new data released this spring from the GIC, MWRA projects a decrease of $601,046 from the proposed FY19 CEB. The Advisory Board expects this reduction to be included in the final FY19 CEB.

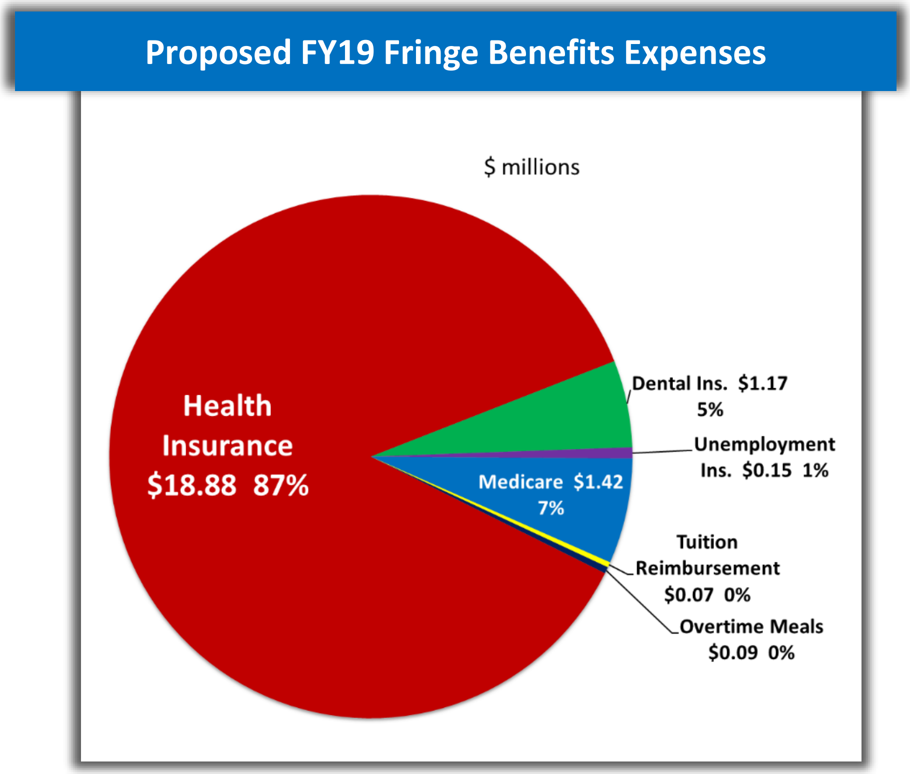


Figure 25

Workers' Compensation

- Based on a three-year average of costs (FY15-17 = $2,322,609)
- Average spending has been $2.2 million since FY 2010, but varies from year to year.
- Factors include number and severity of cases, increases in medical expenses over the years and settlements reached.
- MWRA staff administer the program including processing and monitoring injured employees' claims, coordinating claims investigations, working with injured employees to return them to work, and attending hearings at the Department of Industrial Accidents
- MWRA is self-insured
- Authority uses services of a third party administrator for claims management, utilization review, payment processing for lost time compensation, and payment of medical bills
- Annual budget includes actual expenses for weekly compensation payments to injured employees for lost time, payments for medical care, and other expenses (DIA hearing fees, medical examinations costs, and investigation services)
- The budget also includes reserves for each workers' compensation claim (both compensation for lost time and medical expenses) which represent the estimated future liability for each claim

The Advisory Board expects the Authority to increase the "worker's compensation" category of expense by $100,000.

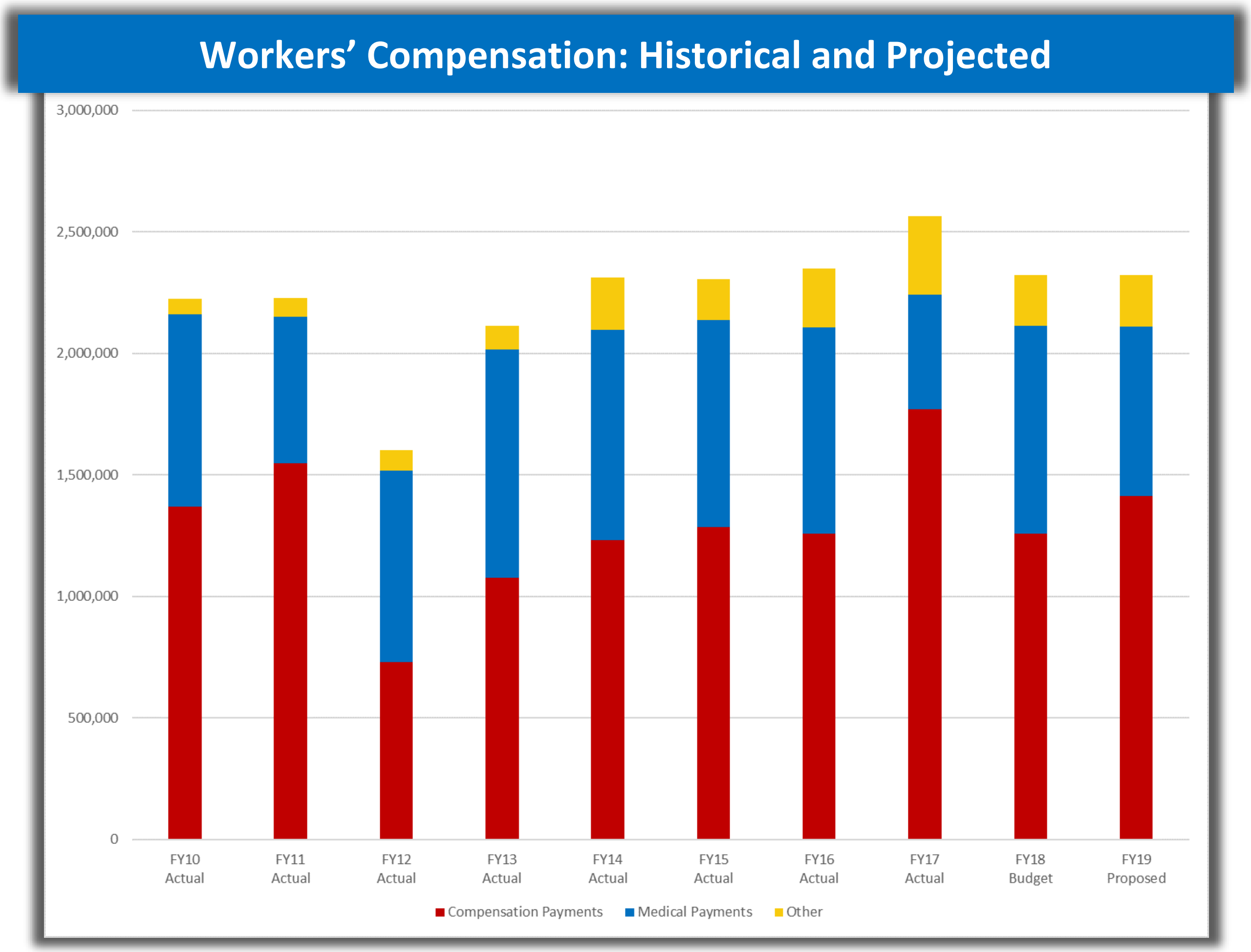


Figure 26

- MWRA maintains ongoing safety and training programs to promote and maintain a safe work environment, including confined space entry, trench safety, ladder staging, evacuation training, electrical safety, and safe lifting training
- Light duty assignments are also utilized
- The Authority reports regularly on injury and illness rates as well as highlights of the workers' compensation program (including light duty returns), in the quarterly Orange Notebooks

Overtime

- Increased by 3.3% (+$137 thousand)
- Due largely to planned maintenance
- Largest drivers include:
  - Wastewater operations (6% increase of $49.2 thousand)
  - Metro maintenance (15.7% increase of $85.3 thousand)

The Advisory Board expects the MWRA to increase its overtime budget by $200,000.

Indirect Expenses

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Pension	$3,277,369	$7,110,663	$3,833,294	117.0%
Scheduled updated contribution to retirement fund.				
Post-Employment Benefits/Additional Pension Deposit	5,035,422	5,574,152	538,730	10.7%
All other benefits for retirees (e.g. health insurance).				
Insurance	2,013,452	2,099,064	85,612	4.3%
Insurance and payments/claims.				
Mitigation Payments	1,596,950	1,614,262	17,312	1.1%
Mitigation payments to Quincy and Winthrop.				
HEEC Payments	957,445	1,386,832	429,387	44.8%
Cross-harbor cable to Deer Island (includes both debt service and O&M components).				
Watershed Reimbursements	25,164,006	25,906,428	742,422	3.0%
Supports the operations and related costs of the state's Department of Conservation and Recreation, Office of Watershed Management.				
Additions to Reserves	821,116	1,732,193	911,077	111.0%
1/6th of all planned Operating Expenses.				
TOTAL INDIRECT EXPENSES	**$38,865,760**	**$45,423,594**	**$6,557,834**	**16.9%**

Table 27

Other Highlights

- Pension is 98.3% funded (as of January 2017)
- FY18 pension annual required contribution (ARC) of $7.1 million is based on FY24 schedule for reaching full funding
- Other Post-Employment Benefits (OPEB) combined with pension obligations are treated as one total liability, with funding for OPEB contingent upon pension full funding
- Insurance expense based on anticipated market conditions
- Costs of the Division of Watershed Management are treated as a reimbursement to the state and include PILOT payments and debt service on watershed land purchases, as well as direct operating expenses
- HEEC payments for O&M and debt service charges increased $429.4 thousand (44.8%). The funding component for the current cable capital investment ended in May 2015; O&M charges continue

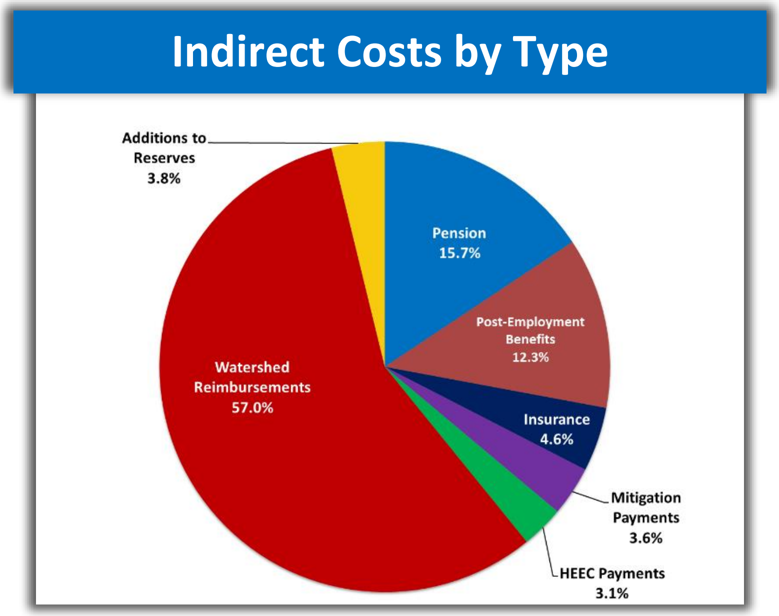


Figure 27

"Delta Report" Indirect Expenses Increase $6.6 million

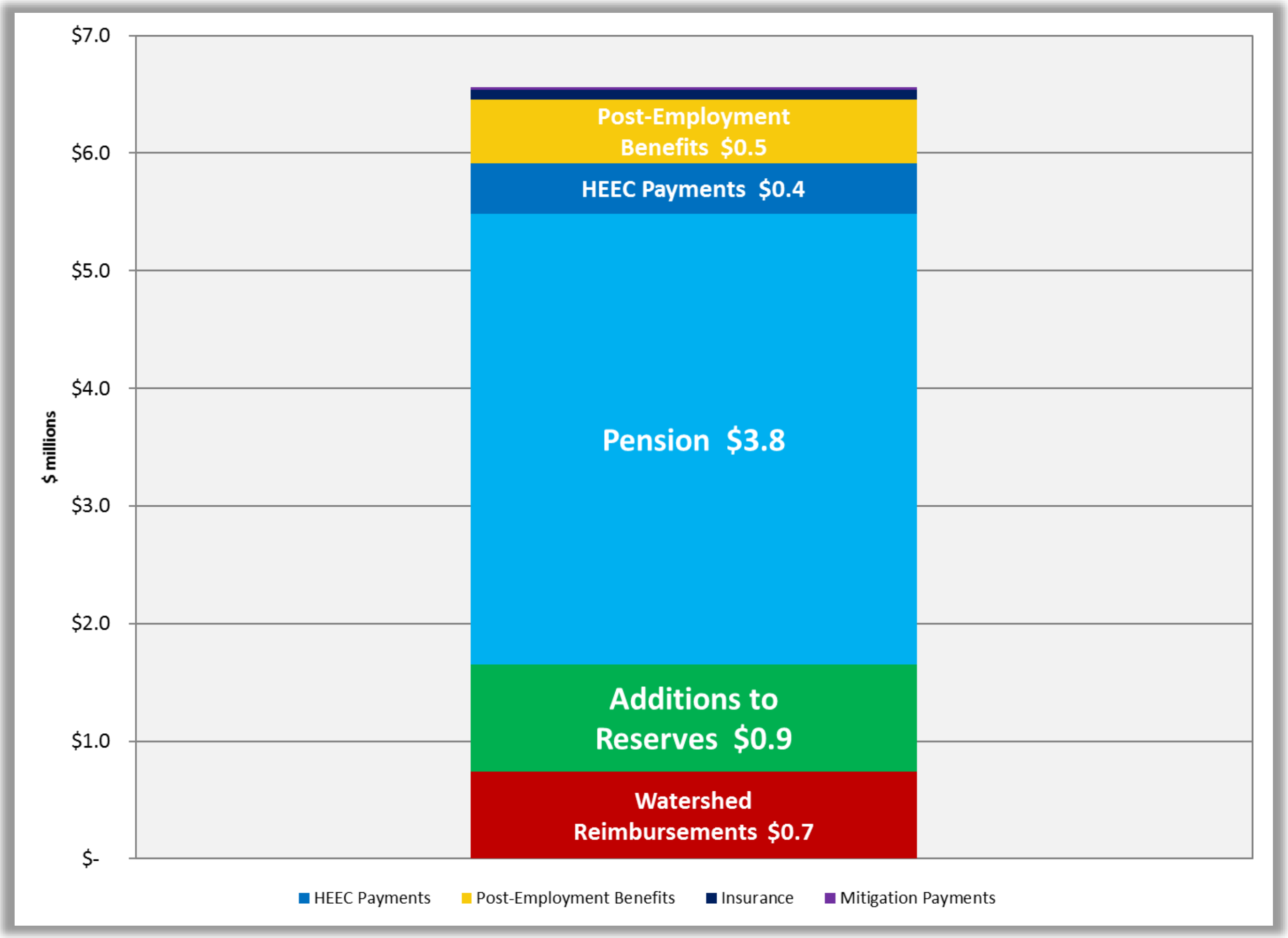


Figure 28

Other Post-Employment Benefits (OPEB) and Pension

- Retirement fund is still on track to be fully funded by 2024
- FY18 pension/OPEB expense: $8.3 million
  - $3.3 million = annual required contribution
  - $5.0 million = optional OPEB contribution
- Proposed FY19 pension/OPEB expense: $12.6 million
  - $7.1 million = annual required contribution (ARC) (based on January 2017 actuarial report)
  - $5.5 million = optional OPEB funding
- Governmental Accounting Standards Board (GASB) Statement No. 45 governs the accounting and financial reporting of OPEB
  - Governmental entities are not currently required to fund OPEB
  - All entities comply with GASB 45 by accounting and reporting on its OPEB liability
- The Authority has met all current provisions of GASB 45

The Advisory Board expects the Authority to reduce the FY19 pension fund expense according to the updated actuarial calculations.

The Advisory Board recommends reducing other post-employment benefits expenses by $3,681,945, unless a multi-year approach that addresses future pension expenses is adopted, such as one presented below. (See Policy Chapter for more information)

The Advisory Board recommends that MWRA staff recommend to the Retirement Board a schedule extension to 2028 while keeping the assumed rate of return at 7.5%. Should this schedule be adopted, the Advisory Board withdraws its recommendation to reduce OPEB by $3,681,945, and instead reduce the optional debt payment by an additional $3,681,945 beyond the Advisory Board's prior recommendation.

Insurance

- Claims expense, proposed at $0.4 million, is based on a five-year average
- Premiums expense, proposed at $1.71 million, is based on anticipated market conditions
- Bond Resolution requires that an independent insurance consultant review the funding level every three years
- Insurance Reserve Fund is currently funded at $14.0 million

Additions to Reserves

- The Operating Reserve level requirement: 1/6th of all designated expenses
  - Proposed FY19: $1.8 million
  - Final FY18: $821 thousand

The Advisory Board recommends increasing the "additions to reserves" line item for FY19 by $45,249 to correspond to the recommended reductions in eligible line items.

Watershed Reimbursement

- Other costs relating to watershed management have been added in recent years to both the Authority's CEB and CIP budgets. These include funding for new acquisition of watershed lands, dam repairs and PCB removal, as well as dam inspections and invasive species surveys and control.
- In FY16 the MWRA paid off remaining watershed debt service totaling $37 million
  - Up until this point, the payments had been evenly spread at $5.6 million/year
    There will be no more spending in this line item moving forward

Table 28

Watershed Reimbursement				
Categories	**FY18 Budget**	**FY19 Proposed Draft**	**Δ ($s)**	**Δ (%)**
Operating Expenses	$16,663,006	$17,321,427	$658,421	4.0%
Debt Service	0	0	$0	-
Payment in Lieu of Taxes (PILOT)	8,436,715	8,400,000	(36,715)	-0.4%
SUBTOTAL (Expenses)	$25,099,721	$25,721,427	$621,706	2.5%
Revenue	990,000	960,000	(30,000)	-3.0%
TOTAL (Revenue Deducted)	$24,109,721	$24,761,427	$651,706	2.7%
Proposed Watershed Capital Budget A capital budget was proposed for the watershed beginning formally in FY17. This is separate from the Watershed Division's operating budget.				
Capital Projects	1,050,000	1,145,000	95,000	9.0%
TOTAL	**$25,159,721**	**$25,906,427**	**$746,706**	**3.0%**

Table 29

Watershed Revenues				
Categories	**FY18 Budget**	**FY19 Proposed Draft**	**Δ ($s)**	**Δ (%)**
Interment Fees	$0	$0	$0	-
Fish & Boating/Deer Hunt	240,000	230,000	($10,000)	-4.2%
Rents	0	0	$0	-
Forestry Sales	200,000	300,000	$100,000	50.0%
Miscellaneous	50,000	30,000	($20,000)	-40.0%
Prior Year Refunds	0	0	$0	-
Hydropower/Tr Lines	500,000	400,000	($100,000)	-20.0%
TOTAL	**$990,000**	**$960,000**	**-$30,000**	**-3.03%**

- Watershed revenues function as an offset to the total Watershed Reimbursement.

Policy Point

Watershed Capital Budget

"Self-Insurance Does Not Mean No Insurance – Protect Assets – Hold Ratepayers Harmless"

The Division of Water Supply Protection's new capital budget for larger projects and needs is now in operation. The Advisory Board still believes that a clear capitalization policy is important for long-term watershed management practices. Alleviating the burden on ratepayers from paying cash for projects which can be funded over thirty years plays a role in maintaining fiscal and sustainable rates while also contributing to quality watershed management. Last year, the Advisory Board explained that an appropriate capitalization policy is critical for DWSP to move forward. We encouraged the Authority and the DWSP to develop criteria on the agency's working relationship on managing capital projects using a tiered approach where some projects are managed by MWRA and some by the DWSP. While this policy was initially minded towards project management and funding, recent events in the watershed have highlighted the need for further development within the agreement.

In April 2018, a state-owned building, maintained by DWSP, serving the watershed in the Quabbin area was destroyed in a fire. While there were fortunately personnel injuries or loss of life, the building was a total loss. The loss included tools, vehicles, and the workspace of eight watershed employees. As the building fell under the state's ownership, it came under the jurisdiction of the state's insurance policy. It was then revealed that even though the state was self-insured, it did not have specific reserves to address unexpected events like the Quabbin fire.

Without any insurance funding, all costs to replace the building and associated equipment fall upon the MWRA, and correspondingly the communities. This is similar to a case with a University of Massachusetts academic building that was damaged from a fire in 2012. Since there was no insurance and no funding set aside for such accidents, the school had to wait nearly six years before rehabilitation could begin.

The ratepayers' investment in the watershed cannot come down to the protection of an unfunded insurance policy. "Self-insurance" does not mean "no insurance."

The Advisory Board recommends MWRA remove funding for all Watershed Division capital projects – both in the CIP and as part of the Watershed Reimbursement CEB line item – until either insurance or an insurance reserve funded by the Commonwealth is established for the state buildings and equipment in the watershed.

Maintenance Expenses

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Buildings and Grounds Expense Materials and services for maintaining buildings and grounds.	$4,811,191	$5,122,837	$311,646	6.5%
Automotive Expense Materials and services for maintaining vehicles.	668,000	638,000	-30,000	-4.5%
Plant and Machinery Expense Materials and services for maintaining plant and machinery expenses. (E.g. drive chains, facility painting and coating)	12,164,176	11,504,374	-659,802	-5.4%
Pipeline Expense Materials and services for maintaining pipeline.	1,648,307	1,884,132	235,825	14.3%
Specialized Equipment Expense Materials and services for specialized equipment. (E.g. grit screens, lab equipment repairs, sewer bucketing equipment)	4,555,285	4,084,667	-470,618	-10.3%
Computer Expense Includes materials services, software licenses and upgrades.	4,116,697	3,870,817	-245,880	-6.0%
Electrical Expense Materials and services for maintaining electrical systems.	2,561,133	3,123,208	562,075	21.9%
All Other Maintenance Expense Includes HVAC materials and services and purchase cards.	1,675,996	1,409,546	-266,450	-15.9%
TOTAL MAINTENANCE EXPENSE	**$32,200,785**	**$31,637,581**	**-$563,204**	**-1.7%**

Table 30

Other Highlights

- FY19 proposed spending decreases $563.2 thousand
- Maintenance expense is 13.3% of all direct expenses
- Deer Island maintenance: $13.3 million
- Field Operations maintenance: $11.9 million including:
  - CWTP
  - Headworks
  - CSO facilities
  - Water and wastewater pump stations
- Other Operations Division maintenance expenses:
  - Clinton WWTP: $0.54 million
  - Laboratory Services: $0.49 million
  - All other maintenance expense: $1.4 million
- Makes up 14.5% of all maintenance spending and includes:
  - MIS: $3.7 million
  - Fleet maintenance: $0.7 million
  - Residuals Maintenance is now funded in the CIP
  - Maintenance needs are also funded through the technical assistance group of engineering contracts and through the capital program

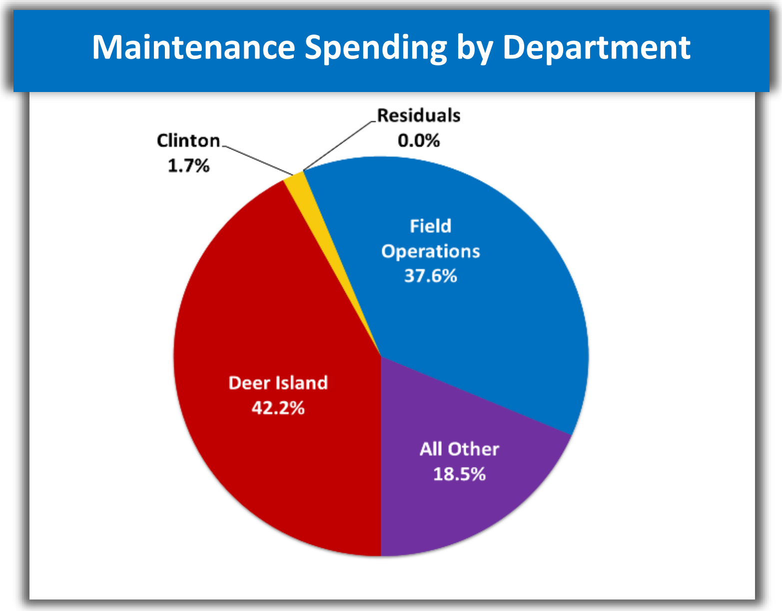


Figure 29

"Delta Report" Maintenance Spending Decreases $563 Thousand

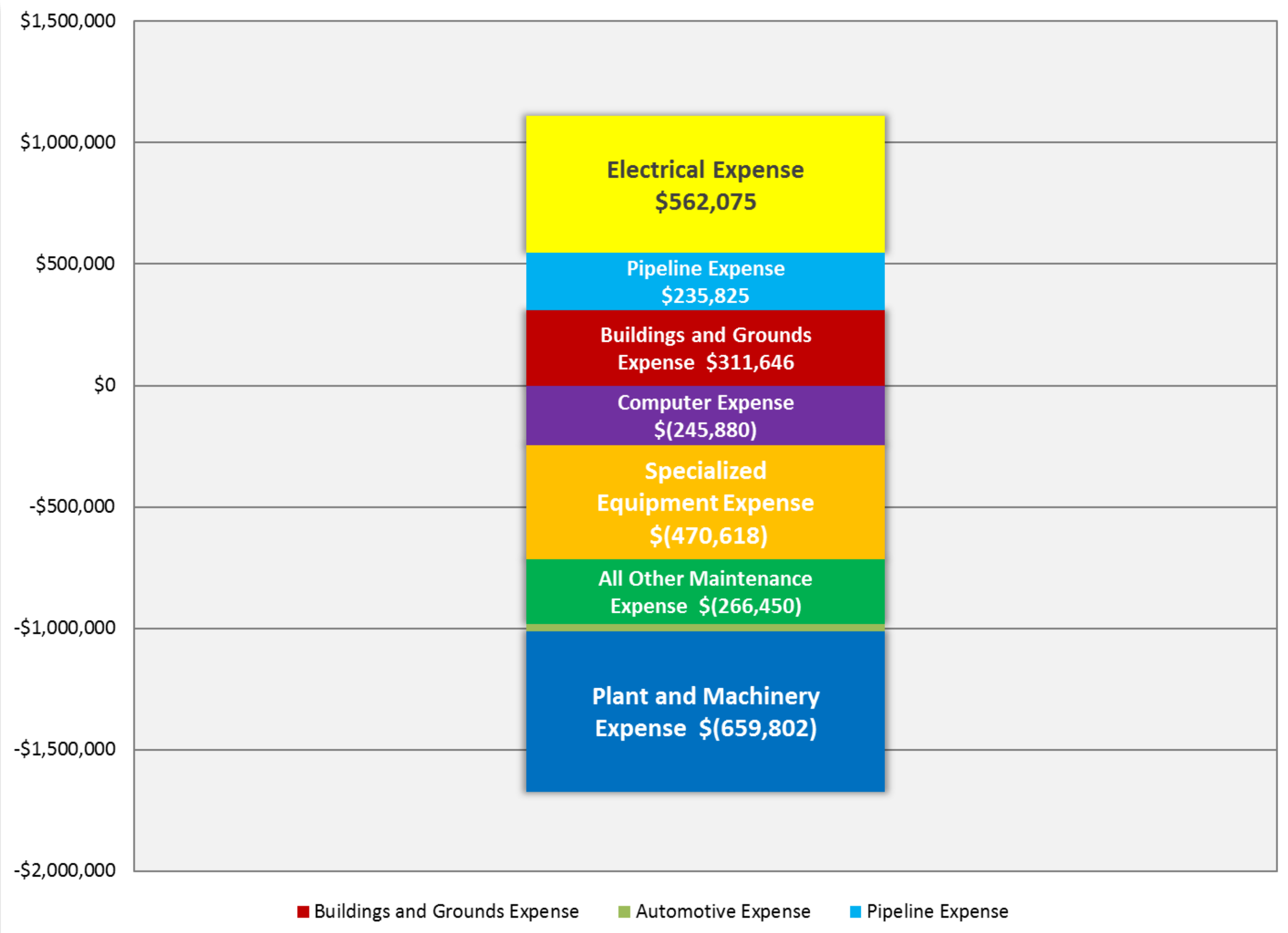


Figure 31

Deer Island Maintenance Totals $13.3 Million

- Materials: $6.0 million
    - 45% of Deer Island's maintenance budget
- Services: $7.37 million
    - 55% of Deer Island's maintenance budget
- Deer Island maintenance decreases $125 thousand
- Plant and machinery services and materials: $8.49 million
    - Makes up 64% of all Deer Island maintenance expense
- Electrical system maintenance: $2.10 million
- Cleaning and grounds work: $1.53 million
- Some of the largest projects or contracts include:
    - Boiler maintenance: $1.5 million combining
        - Boiler maintenance
        - Hydro maintenance
        - Steam turbine generator (STG) maintenance
    - Cryogenic Maintenance Services: $0.50 million

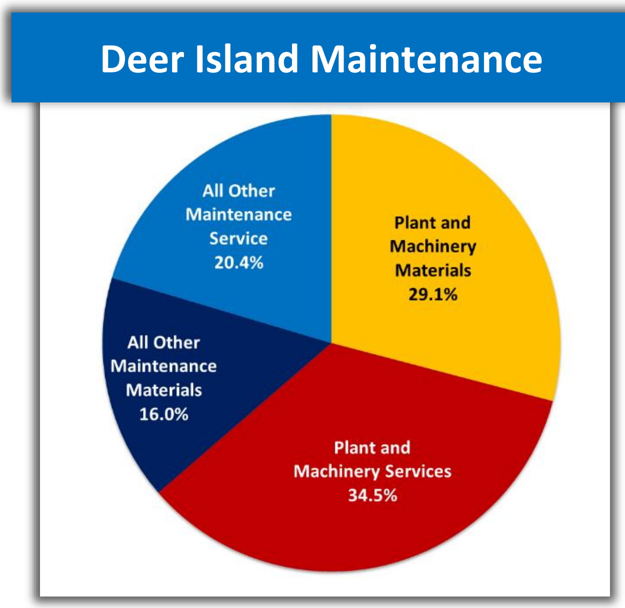


Figure 30

- Medium/Low Voltage Preventive Maintenance: $0.48
- Janitorial Services: $0.45 million
- PICS and HMI Support: $0.43
- Combustion Turbine Generator (CTG) maintenance: $0.34 million
- Pipe Cleaning: $0.30 million
- RHW Pumps: $0.30 million
- Secondary Scum Pumps: $0.30 million

Field Operations Department (FOD) Maintenance Totals $11.9 Million

- FOD maintenance spending decreases by $254 thousand (-2.1%) from FY18
- Budget includes:
  - Day-to-day needs: $4.9 million
  - Service contracts: $4.2 million
  - Major projects: $2.3 million
  - Energy initiatives: $0.45 million
- Major projects include:
  - Manhole Rehabilitation: $0.33 million
  - Invasives Control: $0.19 million
  - Tank Cleaning at Norumbega: $0.15 million
  - Upgrade VFDs at Framingham: $0.85 million
  - Overhaul rotating assemblies at Quincy and Hayes: $0.80 million

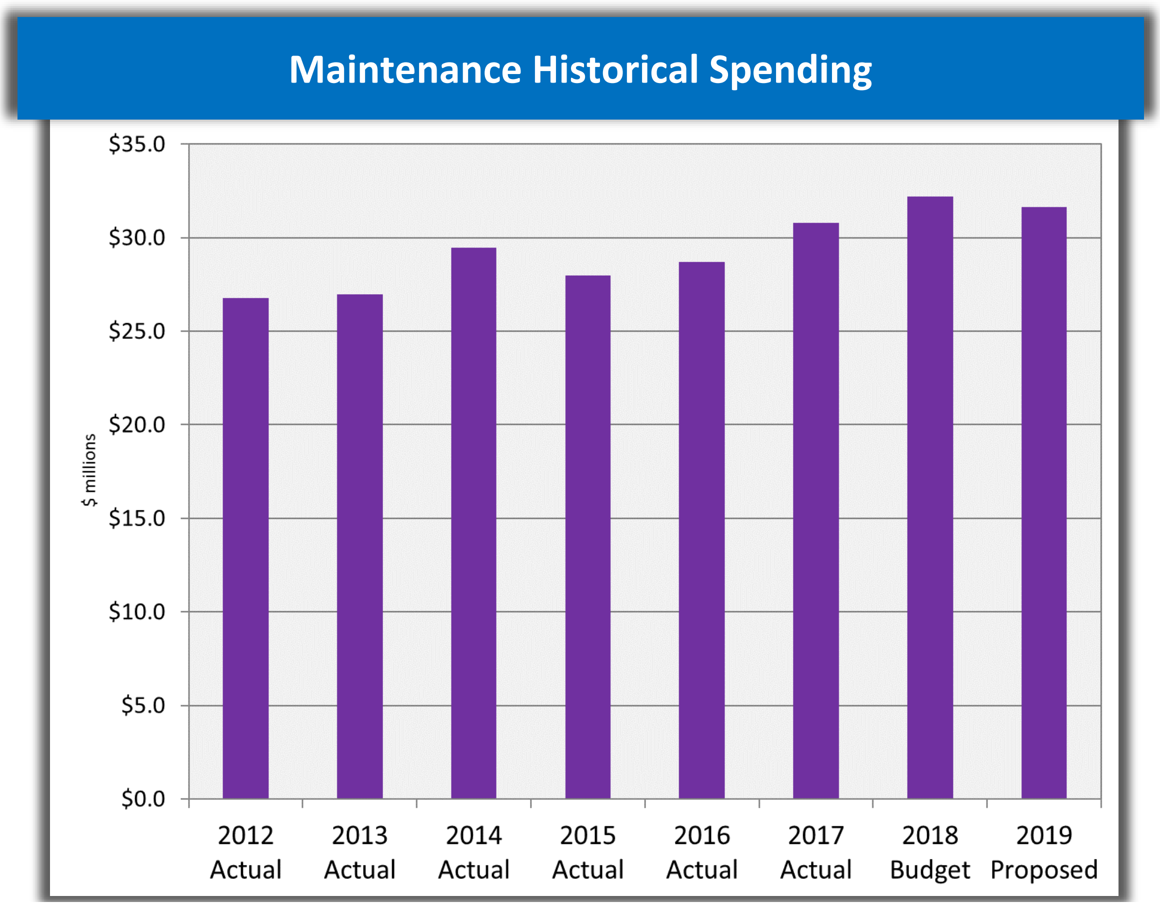


Figure 32

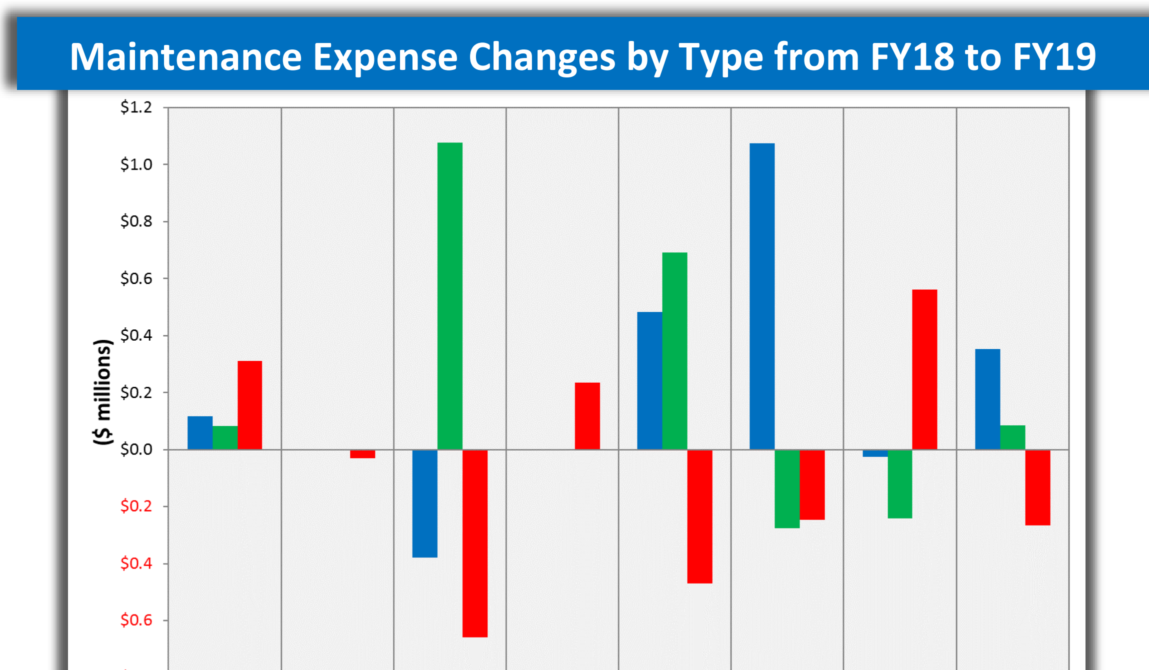
Clinton Wastewater Treatment Plant (CWWTP) Maintenance Totals $539 thousand

- Increase from FY18: +$13.9 thousand (+2.7%)
- Increase mainly due to addition of new HVAC and Electrical Services contracts
- Maintenance represents 23% of the FY19 proposed budget for CWWTP

Expected Changes for Final FY19 CEB

- The MWRA has informed the Advisory Board of some expected changes to the maintenance line item being included in the final FY19 CEB.
- Major decreases to the maintenance line item include:
  - FOD Pipeline Services: -$247 thousand
    - Actual paving bids received
  - Deer Island Plant and Machinery Materials: -$160 thousand
    - Project slippage
  - Lab Services Building and Grounds Services: -$143 thousand
    - Shifted project to CIP
- Major increases to the maintenance line item:
  - MIS Data Center HVAC Center: +$400 thousand
  - Plant and Machinery Services: +$260 thousand
  - Chelsea Facility Dry Fire Suppression System: +$250 thousand
  - Meter Modem Upgrades: +$200 thousand

The Advisory Board expects the MWRA to increase its "maintenance" category of expense by $621,145 in the final FY19 CEB.



	Buildings and Grounds Expense	Automotive Expense	Plant and Machinery Expense	Pipeline Expense	Specialized Equipment Expense	Computer Expense	Electrical Expense	All Other Maintenance Expense
PFY17	0.12	0.00	-0.38	0.00	0.48	1.07	-0.02	0.35
PFY18	0.08	0.00	1.08	0.00	0.69	-0.28	-0.24	0.08
PFY19	0.31	-0.03	-0.66	0.24	-0.47	-0.25	0.56	-0.27

Figure 33

Other Services

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Pelletization	$12,822,323	$13,292,288	$469,965	3.7%
NEFCo contract to process and dispose of sludge pellets				
Lease	3,687,868	3,821,868	134,000	3.6%
Charlestown ($1.5 million + taxes and operating expenses), Chelsea ($1.9 million), Marlborough Records Center ($40 thousand).				
Telephone	2,000,822	1,994,548	-6,274	-0.3%
Voice and data lines; Operations Division				
Grit and Screenings Removal	1,083,606	1,087,680	4,074	0.4%
Removal of grit and screened materials from various facilities.				
All Others	3,169,906	2,954,310	-215,596	-6.8%
Printing, membership dues/subscriptions, advertising; health/safety, police details; Advisory Board operations; various other services.				
TOTAL OTHER SERVICES EXPENSES	**$22,764,525**	**$23,150,694**	**$386,169**	**1.7%**

Table 31

Other Highlights

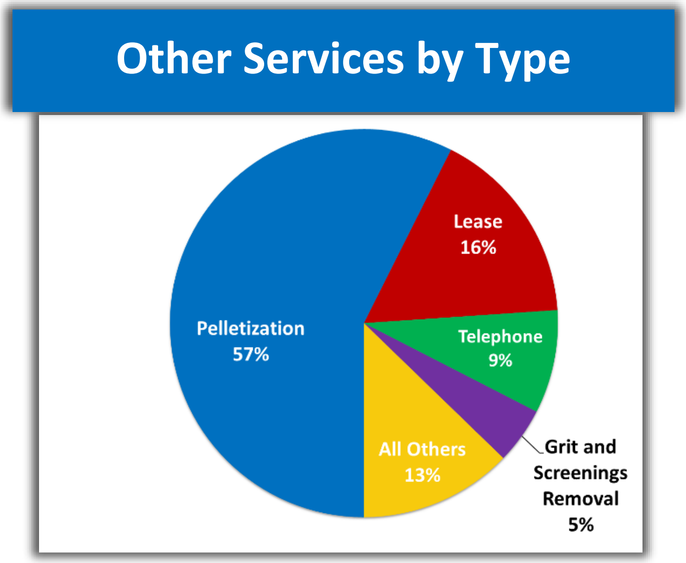


Figure 34

- Sludge pelletization and grit and screenings expenses total $17.1 million or 73.9% of all Other Services expenses
    - New England Fertilizer Company (NEFCo) pelletizing operations costs are based on processing an average of 98.9 tons per day (based on a 3-year average), with annual costs updated by an inflation factor
- The pelletizing contract which ran from FY2001 through December 2015 has been extended and renegotiated for a five-year period which began January 2016
- Grit and screenings (and scum) are removed from Deer Island, the remote headworks, certain pump stations, and CSO facilities. Budget estimates assume 5,945 tons of material to be removed
- Lease costs include costs for the Chelsea property, Charlestown lease and the Marlborough Records Center and Warehouse (including revised rent schedules, operating expenses and property taxes).

"DELTA REPORT" Other Services Increase $386 Thousand

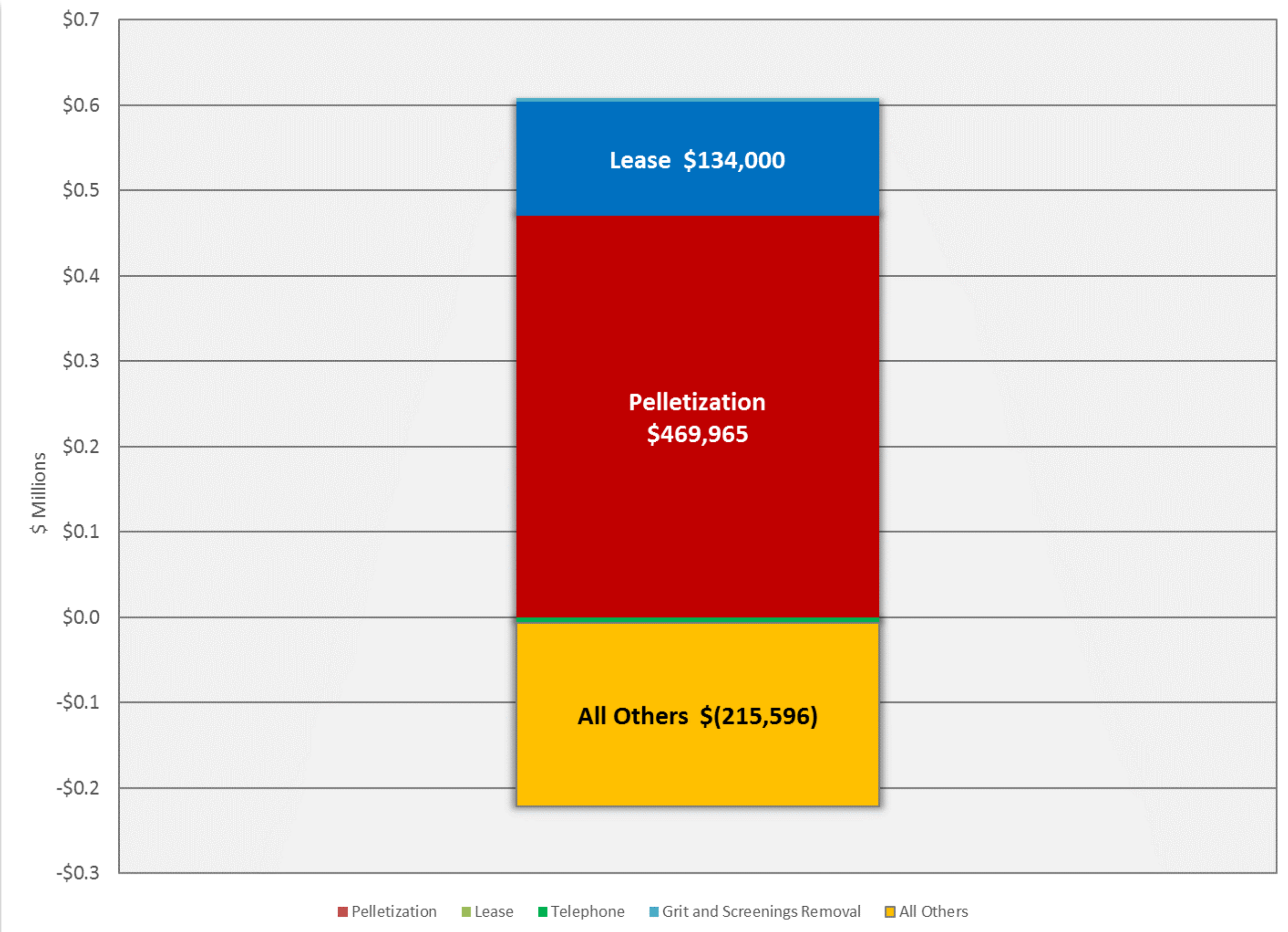


Figure 35

Sludge Pelletization

- Increase from FY18: +$0.47 million (3.7%)
- The budget average is based on a multi-year average of 98.9 tons and reflects the use of an eighth digester and thus reduced quantities on average from previous trends
- No co-digestion impacts on sludge quantities are assumed in the Proposed FY19 CEB
- The inflation factor reflects assumptions for materials and labor, electricity, and natural gas and has declined for this proposed budget
- In March 2015, the Board of Directors, anticipating the December 31, 2015, end of the current NEFCo contract period, approved an amendment extending the contract term for five years, from January 1, 2016, through December 31, 2020. The Authority noted that the negotiated extension will result in a savings of an estimated $1.25 million over the five-year period, and will provide time for new pellet plant dryer technology to be proven, allow for the possible development of more firms to provide competition for a long-term bid, and clarify any uncertainty regarding potential changes in MWRA's sludge quantities.

Grit and Screenings

- Increase from FY18: +$4 thousand (0.4%)
- FY19 quantity estimate: 5,945 tons
    - FY18 quantity estimate: 5,996 tons
    - Based on actual quantities of previous years plus adjustments for modifications projects

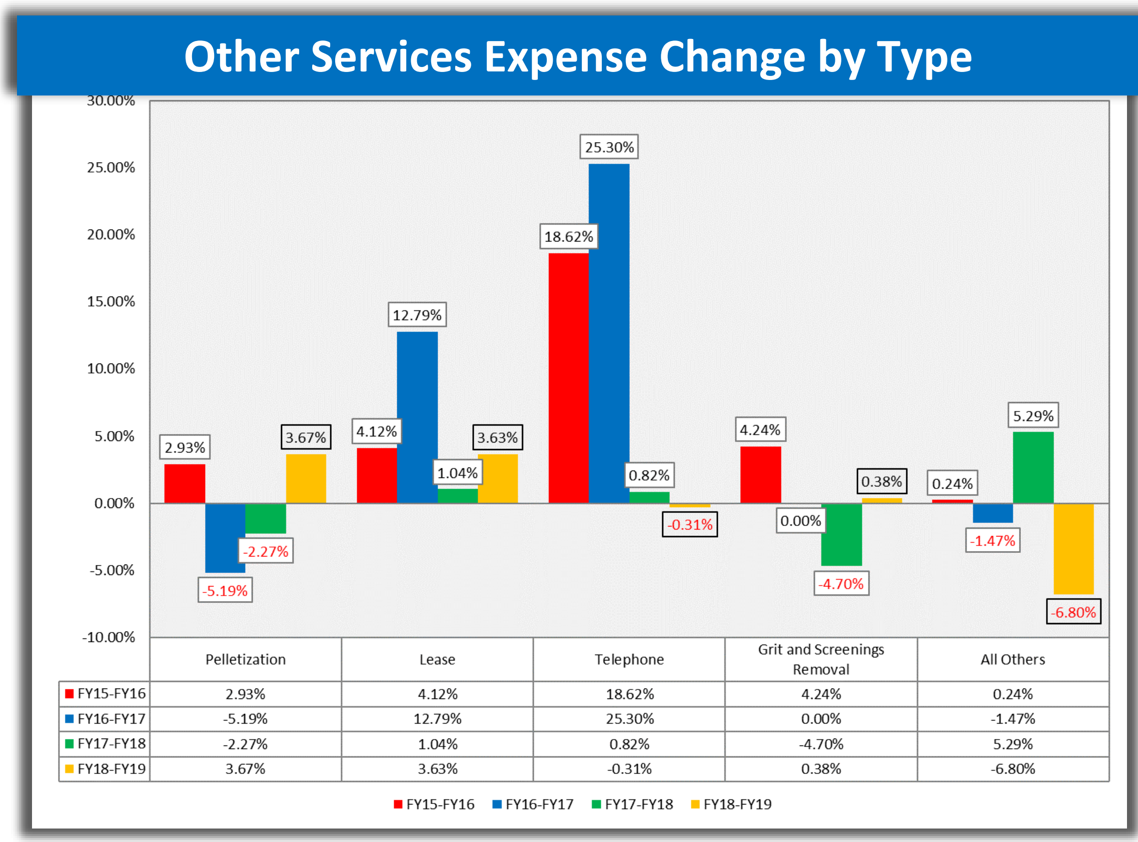
Lease Costs

- Lease costs reflect increases in taxes and insurance charges for the Chelsea lease, and updated rent charges plus taxes and operating expenses for the Charlestown lease
- Rent, operating expenses and tax-related costs are also included for the Records Center and Warehouse located in Marlborough
    - Charlestown: $1.53 million + taxes and operating expenses
    - Chelsea: $1.89 million
    - Marlborough Records Center: $40 thousand

Other Services

- Telephone expense decreases 0.3% to $2.0 million
- Printing expense has increases 0.8% to $202 thousand
- Other services also include memberships, dues and subscriptions, permit fees, and health and safety-related services

The Advisory Board expects the Authority will decrease the "other services" category of expense by $85,282.



	Pelletization	Lease	Telephone	Grit and Screenings Removal	All Others
FY15-FY16	2.93%	4.12%	18.62%	4.24%	0.24%
FY16-FY17	-5.19%	12.79%	25.30%	0.00%	-1.47%
FY17-FY18	-2.27%	1.04%	0.82%	-4.70%	5.29%
FY18-FY19	3.67%	3.63%	-0.31%	0.38%	-6.80%

Figure 36

Utilities

Line Item/Description	Final FY18	Proposed FY19	Δ ($s)	Δ (%)
Electricity	$16,492,724	$16,504,606	11,882	0.1%
Most facilities are powered by Electricity including DITP and CWTP				
Diesel Fuel	2,385,914	2,473,113	87,199	3.7%
Heating, CTGs at DITP, and other backup generators				
Water	2,130,700	2,332,632	201,932	9.5%
A "pass-through" cost to account for Water; self-supplied				
Natural Gas	590,307	593,256	2,949	0.5%
Primarily used for heating various MWRA facilities				
All Other Utilities	135,576	138,310	2,734	2.0%
Oxygen, #2 Fuel Heating Oil, Propane, and all Other Utilities				
TOTAL UTILITIES EXPENSES	**$21,735,221**	**$22,041,917**	**$306,696**	**1.4%**

Table 32

Other Highlights

- Electricity expense increases slightly due to an increase in pricing and small decrease in self-generation from renewable sources. Overall purchased electricity continues to decrease.
- Wind and solar energy generation, hydropower generation, use of steam generators at Deer Island, and improved energy efficiency continue to reduce the amount of purchased electricity over the last several years
- Electricity prices in New England are driven by natural gas pricing rather than oil prices
- Natural gas use at the Fore River pelletizing plant is part of the NEFCo monthly charge, under the Other Services budget category.
- Diesel prices increased slightly, and account for 11.2% of the utilities budget.

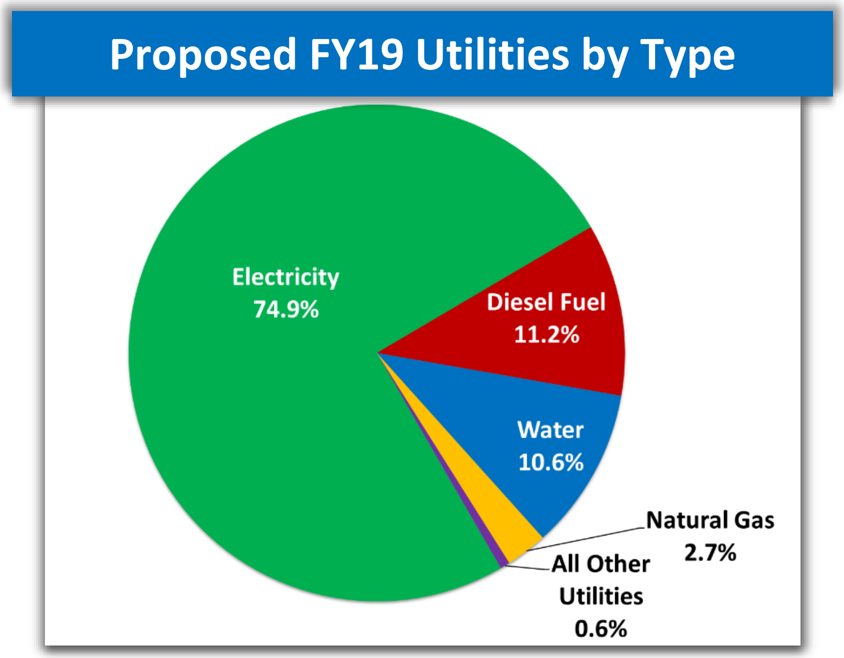


Figure 37

"DELTA REPORT" Utilities Spending Increases $307 Thousand

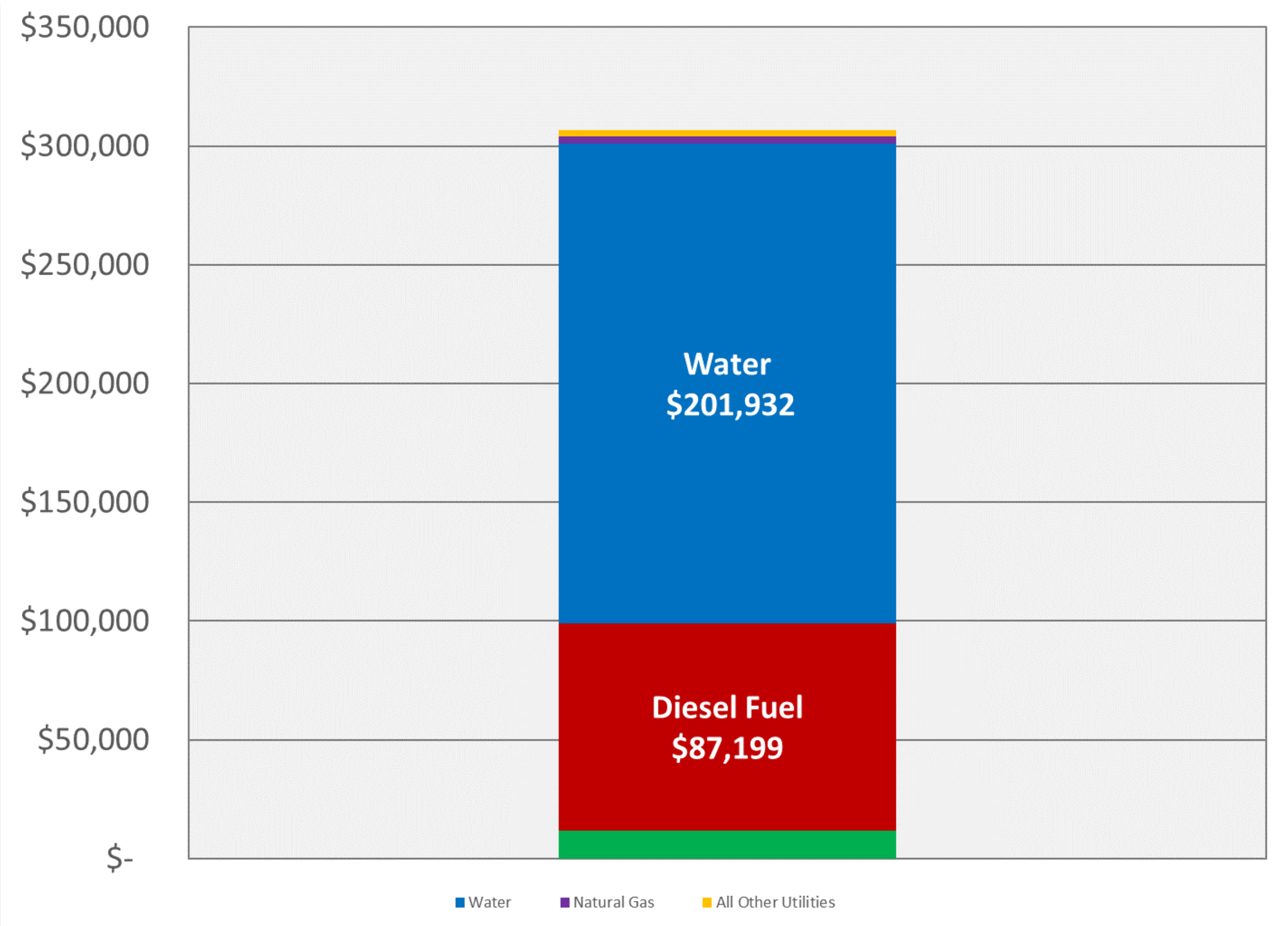


Figure 38

Electricity

- FY19 Deer Island electricity: $8.64 million
    - Increase from FY18: $40 thousand
    - Deer Island electricity spending is 52.4% of all MWRA electricity purchases
- FY19 Deer Island electricity usage 140 million kWh, based off of five-year average
- Goal for total self-generation of electricity at Deer Island for FY19 is 28.7%.
    - Deer Island typically budgeted for 30% self-generated electricity
- Total purchased electricity at Deer Island based on three-year average
    - Energy conservation and efficiency projects also continue to bring purchased electricity amounts down
- The Authority continues to pursue a number of demand-side changes and initiatives

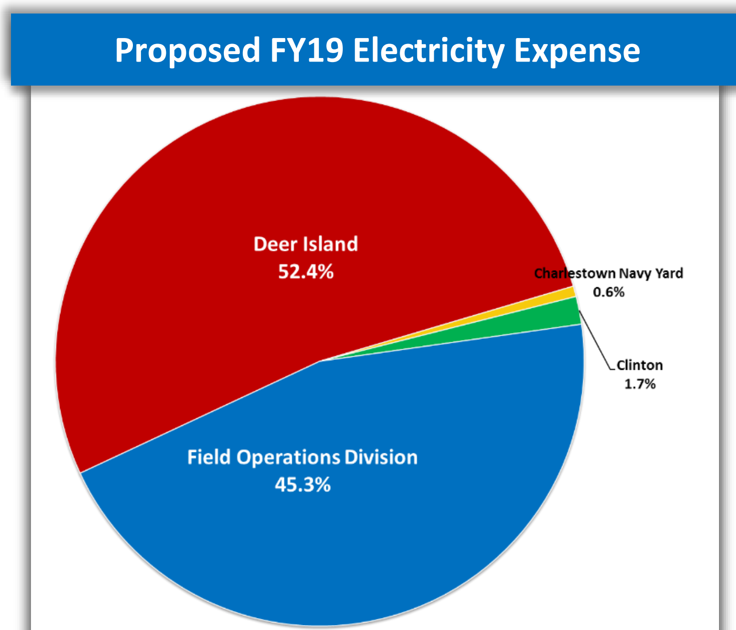


Figure 39

- Field Operations Department (FOD) facilities electricity expense decreases: -$109 thousand (-1.4%)

Diesel Fuel

- FY19 diesel fuel budget: $2.5 million
    - Increase of $87 thousand
    - Deer Island: $1.3 million
    - All other FOD facilities: $1.2 million

Natural Gas

- FY19 natural gas expense: $593.2 thousand
    - Increase from FY18: $2.9 thousand
- Natural gas is used at a number of facilities in the Field Operations Department

Policy Point — Utilities Initiatives

"Spotlight on Core MWRA Energy Team"

This past year, Mike McDonald and Courtney Fairbrother joined Denise Breiteneicher and Israel Alvarez to comprise the core MWRA Energy team. Together, they are leading the charge to increase efficiencies of operations at MWRA facilities. Much of the "low-hanging fruit" is now gone with installations of wind, combined heat and power (CHP), solar, and hydroturbines. As such, they are turning their focus to making gains where possible through data consolidation and reporting, economic assessment, energy use transparency, select energy programs, and continued audits.

Monitoring ongoing alternative energy installations is a large part of the Energy team's work. Solar energy continues to demonstrate excellent performance, and the outlook is rosy, as the technology continues to become smaller and more efficient. The Ogin wind turbine at Deer Island has been removed, and ongoing maintenance to improve performance of other wind installations continues. The CVA Hatchery remains under testing, and the future of the hydroturbines at Deer Island remains uncertain. Since flow at Deer Island is lower than at a water facility, the hydroturbines are not as productive as designed.

Still, energy audits, such as lighting replacements at John J. Carroll Water Treatment Plant, address specific areas for tangible improvements and energy savings. Rehabilitation projects of headworks facilities will incorporate more efficient lighting to realize these types of savings.

As a large consumer of energy, at Deer Island in particular, MWRA is significantly impacted by rate changes. In fact, a change of $0.25 on petroleum products pricing can result in approximately $280,000 in changes to the utilities budget. This makes it all the more necessary to increase efficiencies where possible. The Authority continues to use revenue programs, such as Demand Response at Deer Island, to reduce overall costs. Battery storage to help shave off peak demand is another initiative being pursued by the Energy team, with plans to investigate having Eversource fund these storage facilities.

Looking forward, the Authority hopes to continue strengthening its Renewable Portfolio Standard by taking advantage of funding opportunities (such as those for electric vehicles), assessing opportunities for Mass SMART solar projects, and using the services of an Energy Advisor in the procurement process. The Advisory Board supports these initiatives to increase efficiencies and implement productive renewable energy sources, and looks forward to working with this more centralized Energy team.

Being made aware of pricing and usage trends, the Advisory Board expects the Authority to increase its FY19 CEB "utilities" expenses by an estimated $839,914.

Chemicals

Line Item/Description	*Final FY17*	*Proposed FY18*	*Δ ($s)*	*Δ (%)*
Soda Ash Used primarily at the CWTP; some at Clinton WWTP	$3,577,299	$3,648,100	$70,801	2.0%
Sodium Hypochlorite Used for treatment at DITP ($1.2 million) and CWTP ($1.0 million)	2,431,305	2,540,614	109,309	4.5%
Ferric/Ferrous Chloride For struvite control at DITP.	913,641	1,390,065	476,424	52.1%
Liquid Oxygen Ozone generation at CWTP	449,981	370,452	-79,529	-17.7%
Sodium Bisulfite For dechlorination of treated wastewater and water	223,097	409,228	186,131	83.4%
Hydrofluosilic Acid Fluoride control at CWTP	360,943	235,771	-125,172	-34.7%
Polymer Sludge thickening at DITP and Clinton	316,616	359,033	42,417	13.4%
Activated Carbon For odor control at DITP	328,335	341,055	12,720	3.9%
Carbon Dioxide To increase pH and alkalinity level of water supply at CWTP	314,729	322,036	7,307	2.3%
All Other Chemicals For algae control; corrosion control in Framingham Relief Sewer and DITP	920,988	1,239,500	318,512	34.6%
TOTAL CHEMICALS EXPENSES	**$9,836,934**	**$10,855,854**	**$1,018,920**	**10.4%**

Other Highlights

- Chemicals budget totals $10.9 million or 4.5% of all direct expenses
- Water operations chemicals: $5.7 million
    - Essentially level-funded
- DITP chemicals: $4.4 million
    - Increase of $1.0 million (28.6%)
- Assumes 3 months of new NPDES permit for FY19
- Clinton wastewater treatment plant chemicals: $0.37 million
    - Increase of $39 thousand (11.5%)
- Other wastewater facilities chemicals: $0.32 million

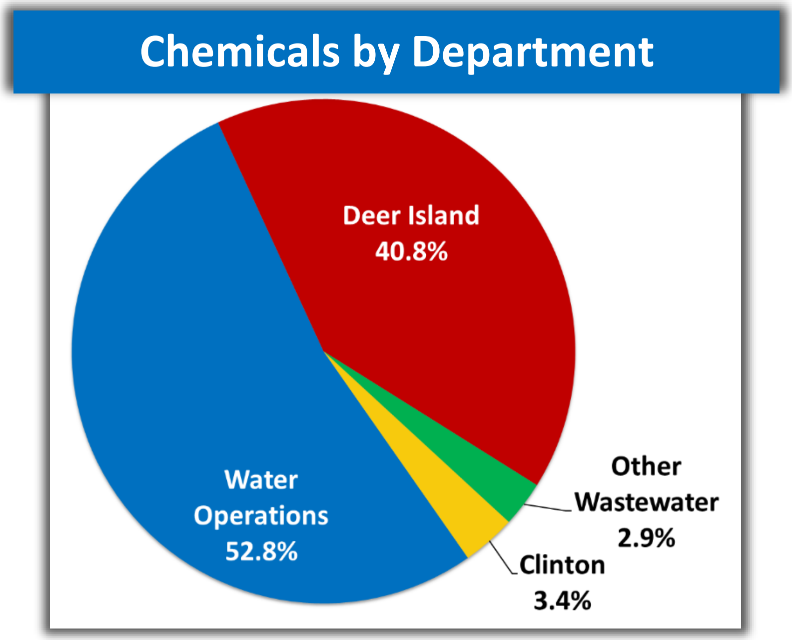


Figure 40

"Delta Report" Chemicals Spending Increases $1.0 Million

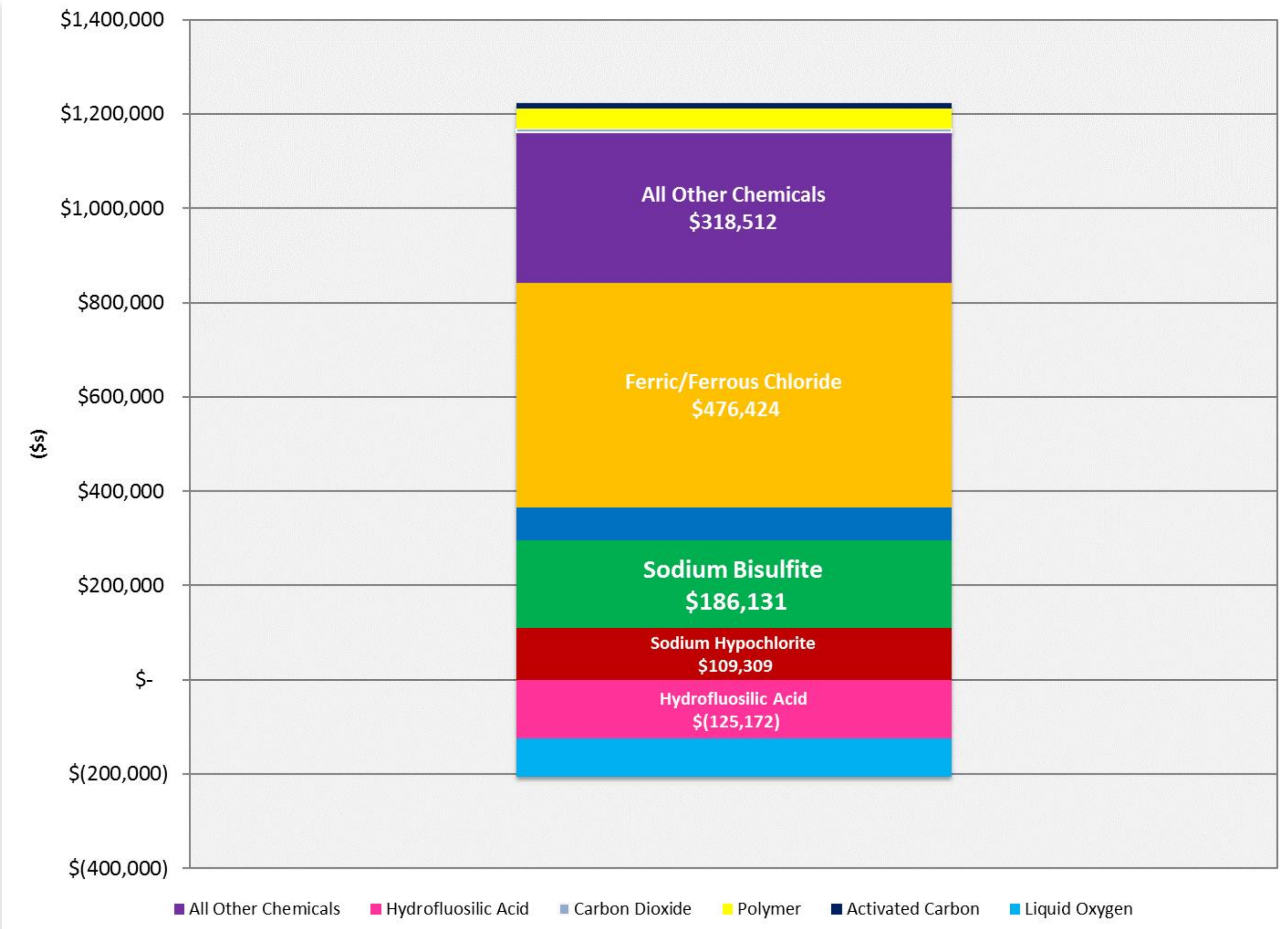


Figure 41

Chemicals Changes by Location

- Deer Island increases due to assumption of three months of a new NPDES permit
    - A new NPDES permit is expected to include additional chemical treatment of enterococcus at a cost of up to $1.3 million per year
    - FY19 includes $294 thousand for the assumed three months

The Advisory Board recommends removing treatment of enterococcus from the FY19 budget and reducing the FY19 chemicals budget by $294,006.

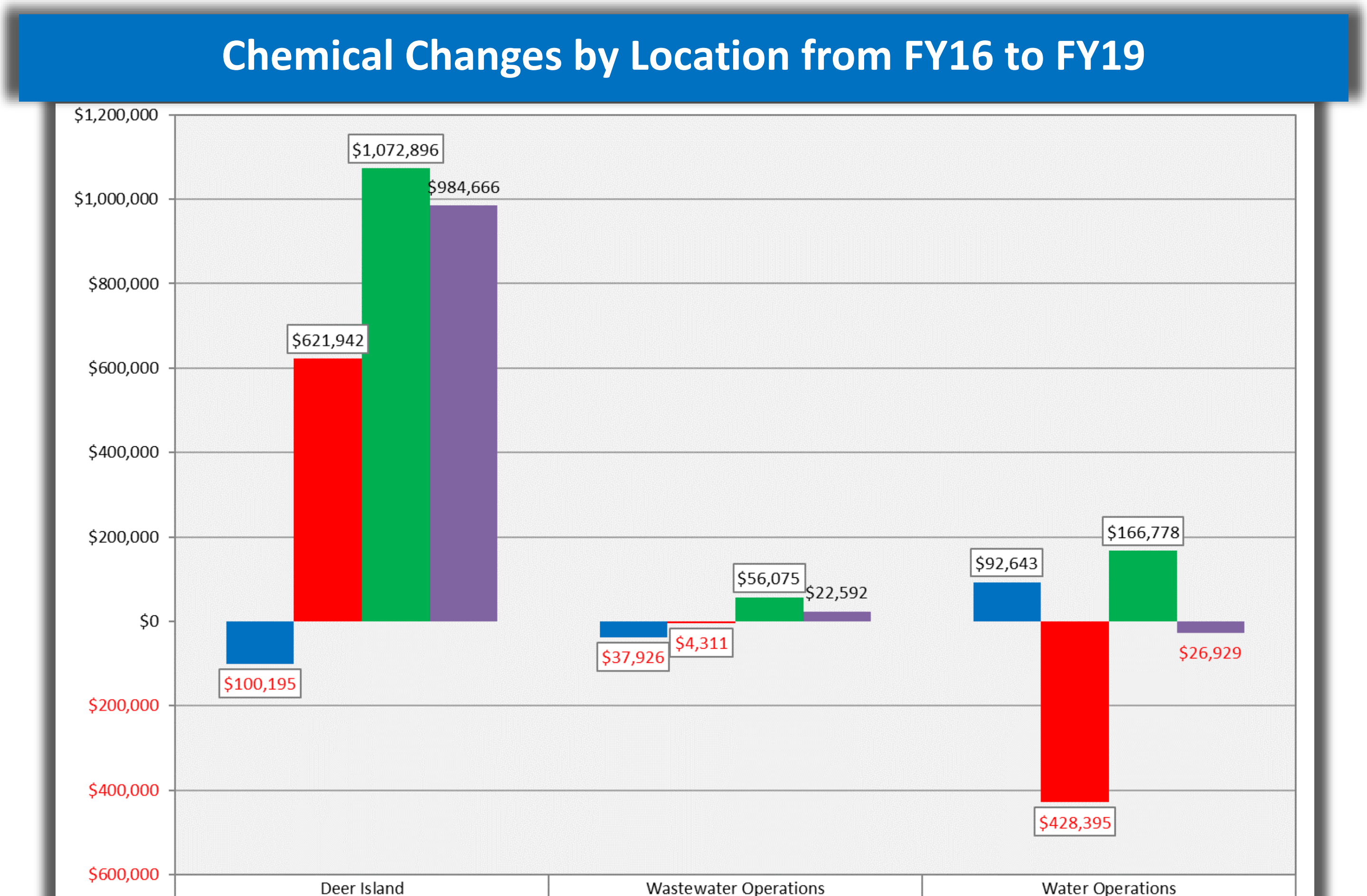
- Water operations chemicals are essentially level-funded from FY18
- Just over 57% (or $6.19 million) of all chemicals spending is for soda ash and sodium hypochlorite

Major Expected Changes to Chemicals for Final FY19 CEB

- Carroll Water Treatment Plant Sodium Hypochlorite: +$249.3 thousand
    - New contract price received

- Clinton Treatment Plant Polymer: +$26.4 thousand
  - Based on early testing of new phosphorus building
- Clinton Ferric Chloride: +$10.9 million
  - Based on early testing of new phosphorus building

The Advisory Board expects that the MWRA will increase the "chemicals" category of expense by $268,602 to reflect updated pricing and usage assumptions.



	Deer Island	Wastewater Operations	Water Operations
PFY16	$100,195	$37,926	$92,643
PFY17	$621,942	$4,311	$428,395
PFY18	$1,072,896	$56,075	$166,778
PFY19	$984,666	$22,592	$26,929

Figure 42

Policy Point

Co-Permittees

"Ready, Willing, Able to Fight the Fight"

No further movement has happened on the National Pollutant Discharge Elimination System (NPDES) permit for Deer Island. Given the staffing and recent resource cuts at the Environmental Protection Agency (EPA), many do not expect the permit to be issued in FY19, hence our reduction in the chemicals line item.

Nevertheless, the Advisory Board remains vigilant and adamant in its position to not allow language designating communities as co-permittees in the final Deer Island NPDES permit. EPA could use such language to either force the MWRA to become environmental regulators of its member communities, or to force the MWRA to perform stormwater work if member communities are out of compliance. The Advisory Board reiterates that the relationship between the MWRA and the communities should not be that of regulator and permittee. The Advisory Board maintains the position that stormwater is the responsibility of the communities, not the MWRA.

As such, the Advisory Board reaffirms its position on this issue and recommends that MWRA insist that the final Deer Island permit does not contain any language naming member communities as co-permittees.

Professional Services

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Lab and Testing Analysis	$1,692,768	$1,740,912	$48,144	2.8%
Primarily harbor and outfall monitoring; some specialized outside lab services				
Security	1,848,000	1,903,440	55,440	3.00%
Security and guard contracts				
Engineering	742,376	982,000	239,624	32.3%
Specialized outside services such as dam inspection and dam safety services; as needed engineering support				
All Other Professional Services	2,938,478	2,990,765	52,287	1.8%
Legal Services, Audit Services, Local Limits Study, communications, energy audits				
TOTAL PROFESSIONAL SERVICES EXPENSES	**$7,221,622**	**$7,617,117**	**$395,495**	**5.5%**

Table 33

Other Highlights

- Security services costs reflect contract costs for the Chelsea, Deer Island, Carroll Water Treatment Plant facilities, and the Charlestown offices
- All other professional services include:
    - Trustee, financial advisor, and related services for the Treasury Department
    - Insurance consultant services
    - Audit services
    - Legal services
    - Energy consulting services
    - Technical and professional development services for the Human Resources Department plus services relating to the employee assistance program and third party claims administration services for the workers' compensation program
    - MIS services relating to the upgrade of the MAXIMO system
    - Communications services, including funding for WAC and WSCAC
        - Other engineering services includes funding for a comprehensive survey in all the reservoirs for invasive plants

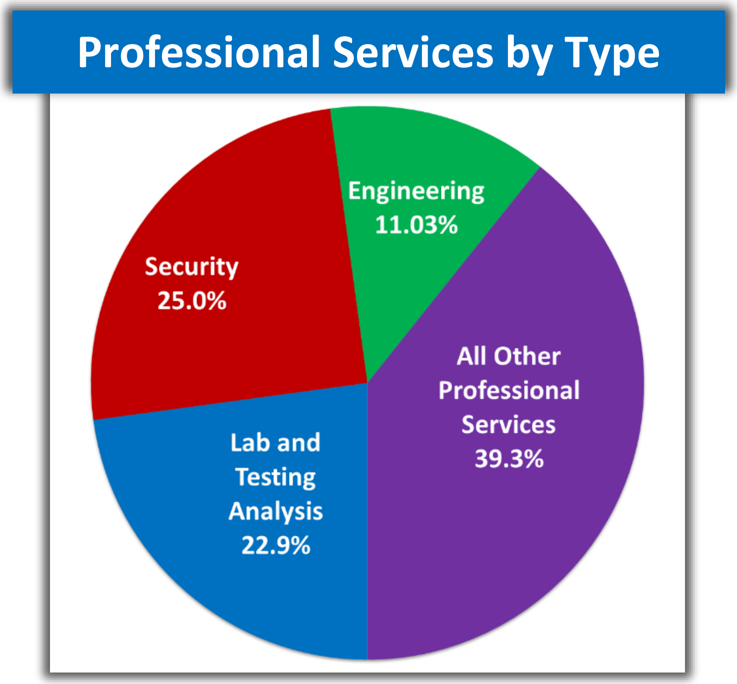


Figure 43

"Delta Report" Professional Services Expense Increases $395 Thousand

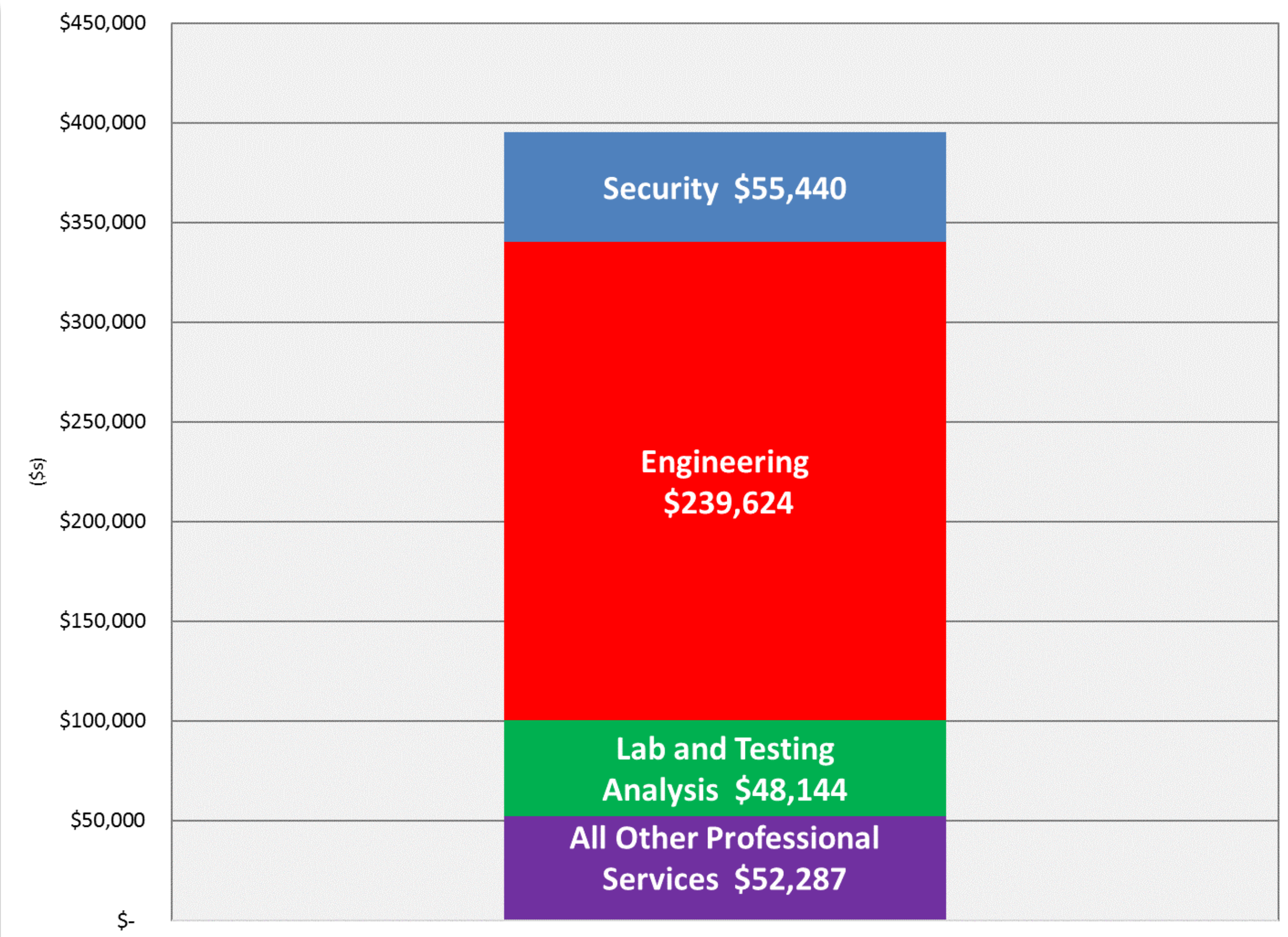


Figure 44

Laboratory, Testing, and Analysis Services

- FY19 harbor and outfall monitoring support: $1.4 million for water column and water quality modeling and monitoring in the harbor and Massachusetts Bay; the proposed budget is based on a three-year average
- Largest area of expense within laboratory testing category
- Monitoring costs linked to existing National Pollutant Discharge Elimination System (NPDES) permit
- Current permit expired in August 2005
- New permit actively being drafted but not yet released for review. Proposed FY19 CEB assumes new permit will be in place for three months of the fiscal year
- FY19 expense is 2.8% higher than FY18. Increases include:
  - Laboratory and testing analysis services contracted for the UCMR4 water quality project
  - Algal toxins and whole effluent toxicity testing

Other Engineering Services Expenses

- Budgeted $155 thousand for as-need engineering services at Deer Island and $42 thousand for engineering services at Clinton

Security Services

- Budgeted at $1.90 million, a 3.0% increase from FY18
- Includes funding for security and related services for the Deer Island Treatment Plant, Carroll Water Treatment Plant and the Charlestown Navy Yard offices for the second year of the contract

All Other Professional Services

- $700 thousand for professional assistance with network infrastructure, applications and design for the MIS Department
- $358 thousand for Processional Development and Technical Training through Human Resources
- $180.7 thousand in support of the WAC and WSCAC advisory committees
- $15 thousand for updating Dam EAP's to match FEMA regulatory changes
- $201 thousand for legal services and workers' compensation claims administration services
- $20 thousand for contribution for modeling work coordinated through the Mystic River Watershed Association, pending further discussions
- $109 thousand for survey of new invasive aquatic plants plus $97 thousand for monitoring mechanical harvesting of aquatic invasive plants in the reservoirs
- $10 thousand for energy audits and advisory services

The Advisory Board expects the MWRA to request an increase of the "professional services" category of expense by $58,859 in its final budget to help cover an equal pay funding study.

Other Materials

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Vehicle Purchase/Replacements Purchases of vehicles and equipment under $100,000.	1,900,000	1,900,000	0	0.0%
Vehicle Expense Bulk gasoline, diesel purchases, mileage reimbursement, and some toll fees.	$771,018	$777,731	$6,713	0.9%
Lab and Testing Supplies Supports Central Lab and TRAC.	908,309	904,309	-4,000	-0.4%
Equipment/Furniture Miscellaneous equipment and furniture.	599,403	757,173	157,770	26.3%
Computer Hardware & Software PCs, printers, plotters, and scanners.	906,742	1,424,674	517,932	57.1%
Office Supplies Office supplies including paper.	251,996	255,794	3,798	1.5%
All Others Includes postage, work clothes, and health and safety materials.	1,355,193	1,361,418	6,225	0.5%
TOTAL OTHER MATERIALS EXPENSES	**$6,692,661**	**$7,381,099**	**$688,438**	**10.3%**

Table 34

Other Highlights

- Funding for vehicle replacement supports purchase of 54-63 vehicles or 11-12% of the active fleet
- Upgrading to Windows 10 in FY19 will require replacing most of the MWRA's PCs
- Vehicle expense, lab and testing supplies, and work clothes budgets are based on updated historical spending

Other Materials Historical Spending

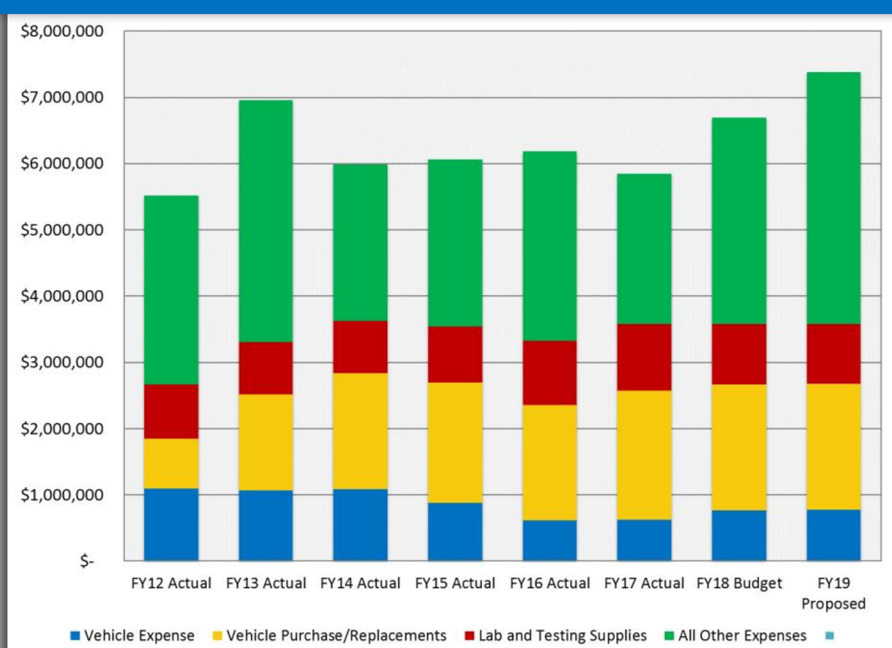


Figure 45

"Delta Report" Other Materials Spending Increases $688 Thousand

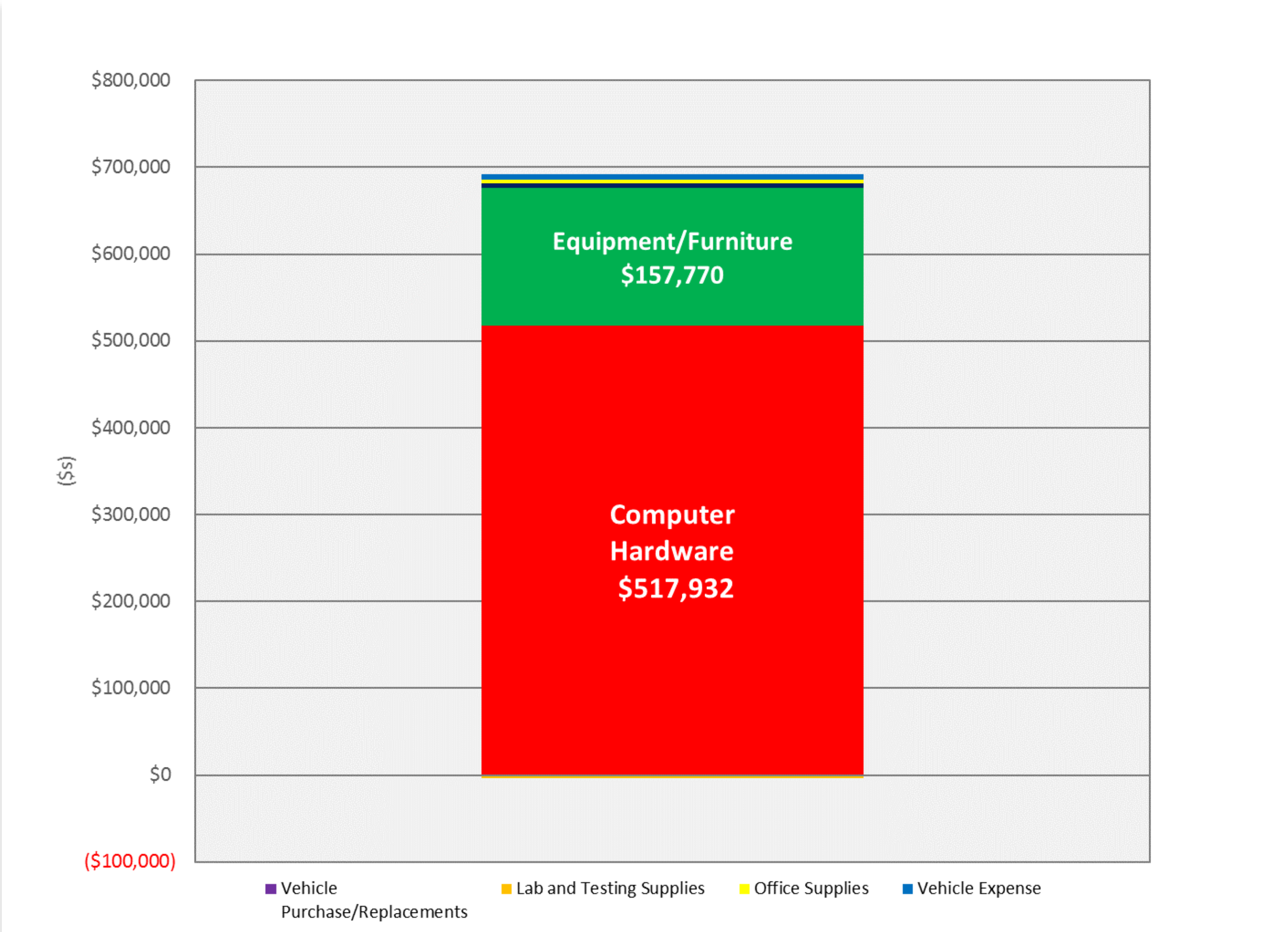


Figure 46

Computer Hardware and Software Purchases

- The computer hardware and software budget increases by $517.9 thousand (57.1%)
    - Increase largely driven by need to replace almost all PCs in the agency due to an upgrade to Windows 10 OS
- Findings of the five-year Information Technology (IT) strategic plan (completed in 2012) include the need to:
    - Adopt more effective and standardized IT management and processes
    - Develop methods to share data quickly across multiple applications
    - Develop streamlined work flows
    - Reduce reliance on paper records and improve access to information
- Because technology evolves so rapidly, the Authority will have to continuously adapt its plans to accommodate changes and updates to its programs and software

Vehicle Purchases

- Vehicle purchases is level-funded at $1.9 million
- Vehicle fleet size is reviewed regularly

Vehicle Expense

- Vehicle expense is essentially level-funded from FY18, increasing only $6.7 thousand (0.9%)
- The Authority continues to reduce fuel consumption by reducing idle times and increasing the number of vehicles powered by fuel other than gasoline and diesel. The Authority procures bulk fuels from state contracts
- The Authority has instituted an Automated Vehicle Locator (AVL) program, which has also resulted in reduced fuel consumption
- Including flex fuel hybrids, about 34% of the fleet is powered by fuels other than gasoline and diesel (See Figure 48)
- The Authority has also reduced the number of domiciled vehicles and increased the use of pooled vehicles, increasing the useful life of the vehicles
- Vehicles at the end of their useful lives for the agency are sold as surplus, resulting in increased income

Equipment/Furniture

- Equipment/furniture increases by $157.7 thousand (26.3%)
  - EnQual Department has initiatives requiring large purchases of equipment

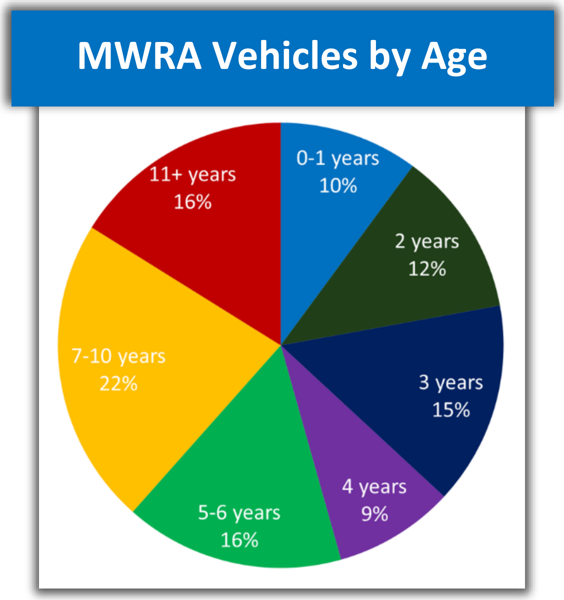


Figure 47

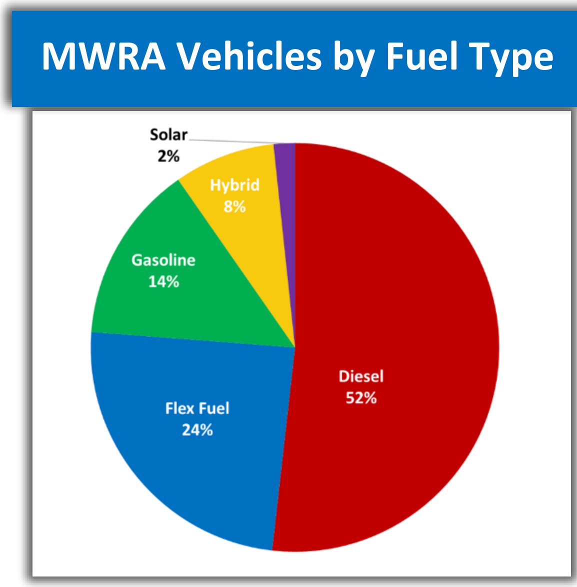


Figure 48

Training and Meetings

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Training and Meetings	$280,053	$350,028	$69,975	25.0%
Out of State Meetings/Briefings	$10,046	$10,110	$64	0.6%
Out of State Prof Assoc/Seminars	$30,200	$27,860	-$2,340	-7.7%
Out of State Industry Assoc/Conf	$9,600	$2,600	-$7,000	-72.9%
Out of State Site Audits	$1,750	$1,785	$35	2.0%
In State Overnight Meetings	$2,225	$2,225	$0	0.0%
In State Local Meetings	$67,745	$57,512	-$10,233	-15.1%
Other Consultants/Vendors	$4,650	$3,650	-$1,000	-21.5%
TOTAL TRAINING AND MEETINGS EXPENSES	**$406,269**	**$455,770**	**$49,501**	**12.2%**

Other Highlights

- Costs cover a variety of meetings, seminars, conferences and training sessions. Most spending supports maintaining professional licenses and certifications, as well as training in the use of specialized equipment, out-of-state site visits (such as water treatment plants that use UV disinfection) and site audits, and health and safety compliance, as well as cyber security training

- Increase from FY18: -$49.5 thousand (12.2%)
- The Authority also budgets nearly $358 thousand for professional development and technical training under professional services in the Human Resources Department.

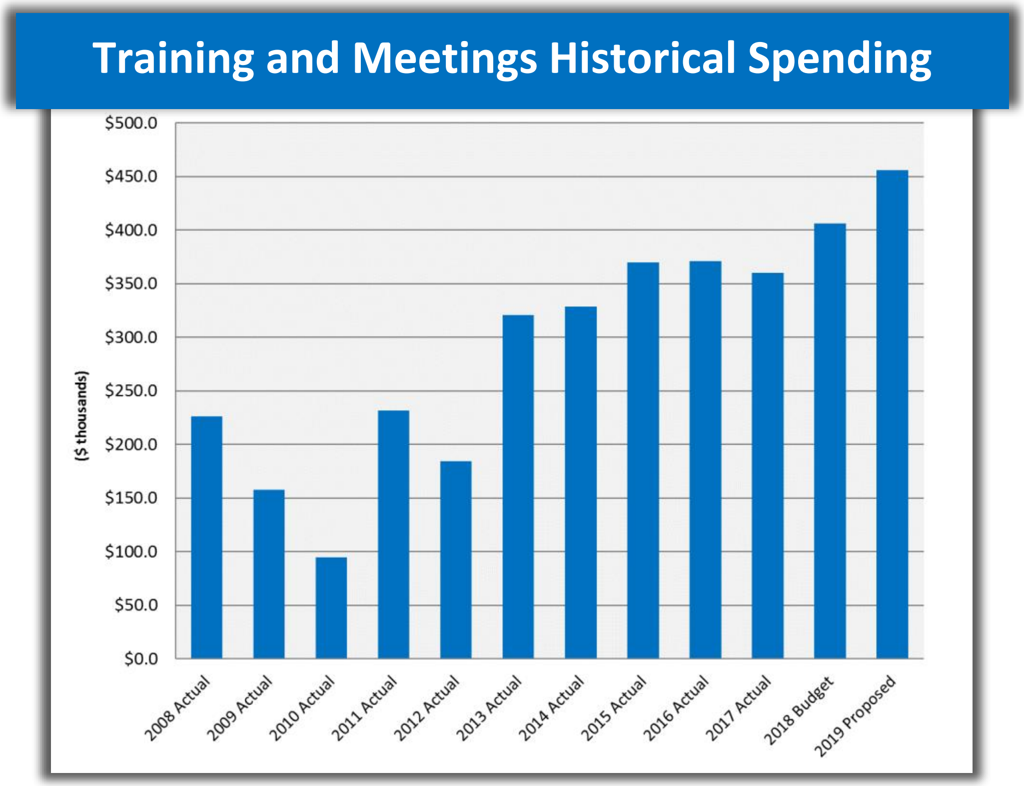


Figure 49

Revenue

Line Item/Description	*Final FY18*	*Proposed FY19*	*Δ ($s)*	*Δ (%)*
Rate Revenue	$717,054,000	$745,080,300	$28,026,300	3.9%
Revenue generated directly from member communities through annual assessments.				
Other User Charges	9,011,070	9,469,932	458,862	5.1%
From 20 customers including CVA communities; emergency water supply connections, and entrance fees.				
Other Revenue	7,359,078	6,225,720	-1,133,358	-15.4%
Includes forestry product sales, fishing, and hunting licenses				
Rate Stabilization	0	0	0	-
From rate stabilization fund.				
Investment Income	10,205,781	12,457,408	2,251,627	22.1%
Interest on both short- and long-term investments.				
TOTAL REVENUES	**$743,629,929**	**$773,233,360**	**$29,603,431**	**4.0%**

Table 35

Other Highlights

- Proposed FY19 rate revenue increase: +$28 million (3.9%)
- Non-rate revenue increase: +$1.6 million
- Other revenue from forestry product sales, fishing, and hunting licenses is credited to the Office of Watershed Management budget.

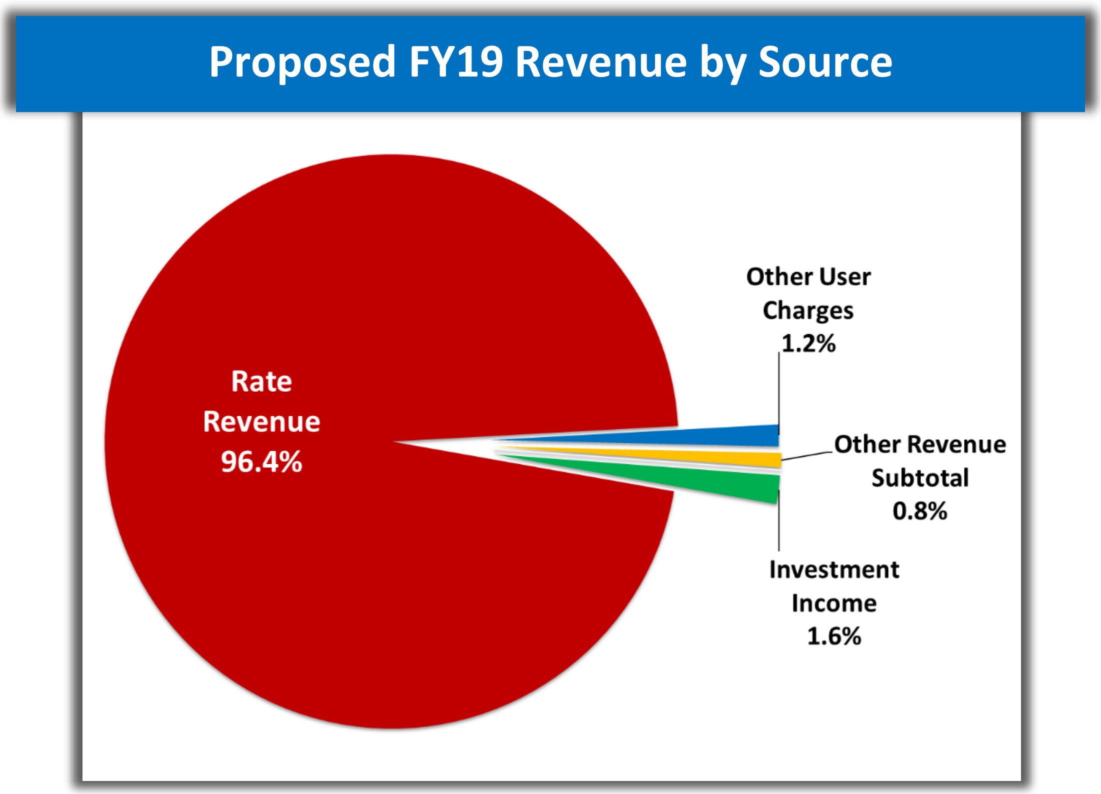


Figure 50

"Delta Report"
Revenue Increases $29.6 Million

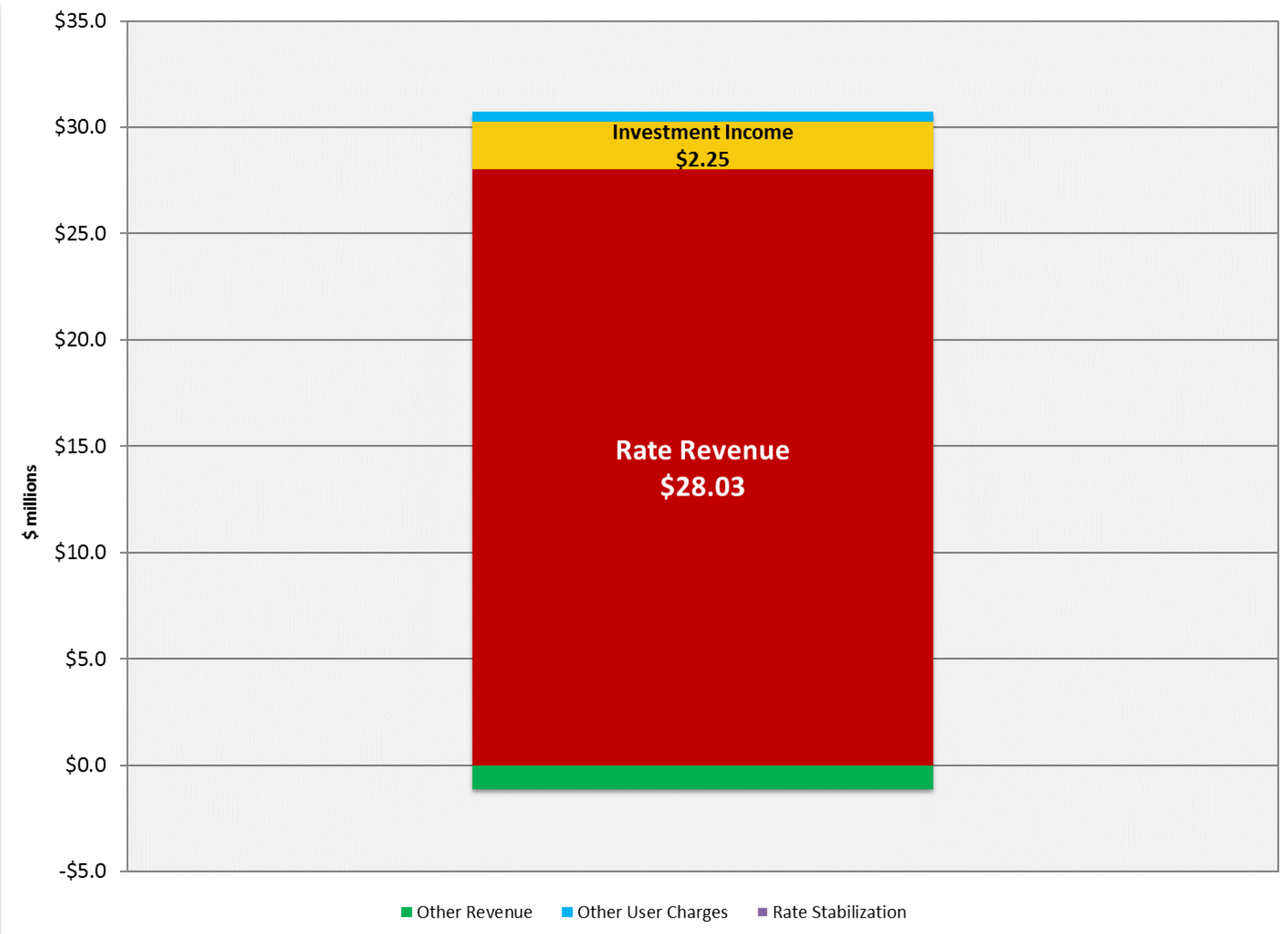


Figure 51

Non-Rate Revenue

- FY19 proposed non-rate revenue: $28.1 million
    - Increase from FY17: +$1.6 million
- Other Revenue decrease: +$1.1 million (-15.4%)

Table 36

Other User Charges		
User	**Charge**	**Notes**
Fernald School	$0	Individual users of sewer system
Commonwealth Zoological (State Zoo)	$44,462	
Westborough State Hospital	$42,026	
DCR Pools/Parks	$29,641	
Regis College	$72,560	
DCR Blue Hills Ski Area	$72,688	
NE Center for Children	$22,690	
Lancaster	$459,229	Income relating to Clinton Wastewater Treatment Plant costs
Worcester	$185,435	
Clinton	$500,000	
Chicopee	$3,554,021	CVA Communities
Wilbraham	$760,807	
South Hadley	$712,655	
WTP Residuals	$454,998	From nine water treatment plants
Entrance Fees	$726,500	Stoughton, Wilmington & Dedham-Westwood
Deer Island	$1,832,220	Transfer payment of sewer cost to water revenue
TOTAL	**$9,469,931**	

Table 37

Other Revenue			
Category	**Budget FY18**	**Proposed FY19**	**Description**
Hydropower Revenue	$209,255	$135,497	Energy-related revenue
Wind Turbines Revenue	$373,153	$405,423	
Solar Power Revenue	$94,803	$97,729	
Renewable Portfolio Credits	$1,231,097	$773,204	
Load Reduction & Forward Capacity	$2,164,943	$1,447,204	
Utility Rebates for Equipment	$100,000	$100,000	
Permit Fees	$2,100,000	$2,100,000	TRAC permit and monitoring fees.
Penalties	$100,000	$100,000	Issued through the TRAC program.
Payments from Commonwealth	$0	$0	For chemical costs via statute.
Miscellaneous Revenue	$985,827	$1,076,663	Includes revenue from Fore River Railroad, antenna licenses, and other miscellaneous revenues.
TOTAL	**$ 7,359,078**	**$ 6,235,720**	

Policy Point — TRAC Permit Fees

"Getting the Fee Structure Back on TRAC"

The Toxic Reduction and Control (TRAC) Program monitors and regulates the wastewater discharges of some industrial users within the MWRA sewer service area. The goal and aim is to ensure that wastewater entering MWRA's system meets all requirements, and to assess penalties when they are not. While the program generates revenue from the permitting process and any issued penalty fees, the process is not sized for complete cost-recovery of the program. The program was designed with this partial cost recovery method in mind. As the cost of wastewater treatment has gone up over the past six years however, the fees associated with the TRAC program have not increased. MWRA last approved increases in FY10, implementing a three-year plan for incremental increases ending in FY12. Now in FY18, the partially recovered costs from the TRAC program are only partially collected.

MWRA had discussed permit fee levels internally a few years ago, but due to economic conditions decided to forego increases at that time. The Advisory Board understands that the program is not intended to recover all costs but continues to believe that recovery cots should change as the operational costs change. The Advisory Board still believes it is time to review the issue. In FY12, revenue from permit fees totaled 53.4% of the TRAC Program's total costs; yet, by FY17 this amount dropped to 42.5% of total costs[12]. Since the program's goal is compliance, and the ideal outcome would be no penalties, the Advisory Board believes cost-recovery calculations should focus on only permit fee revenues.

The Advisory Board has no desire to resize permit fees for full cost-recovery at this time, but does feel that regular increases are necessary. After all, the MWRA's rates mantra is "sustainable and predictable" and the Advisory Board advocates for its member communities to increase its water and sewer retail rates each year as being the fiscally responsible approach for addressing increasing local water and sewer costs. Don't these permit fees also deserve a similar approach?

The Advisory Board believes that the first step is determining just what the right recovery ratio is. One issue to consider is that the process to update permit fees is lengthy and time consuming, requiring notice to permittees and accepting feedback. To undertake this same process each year is arguably not the best use of MWRA staff time. This is what led to the most recent approach to fee increases, where a three-year incremental increase was approved between FY10 – FY12. A multi-year approval was definitely more efficient approach than an annual review; however, the Advisory Board would like to advocate for an annual formula to increases that would make them, in essence, an automatic escalation. Many organizations base automatic increases on charges and fees on indices such as inflation or another benchmark index relevant to the charge being levied. In TRAC, personnel expenses make up 97% of the program's total costs.[13] Given this, linking automatic permit fee increases to increases in personnel costs might make the most sense.

Since the fee update process is so lengthy, immediate action on the matter is necessary. The Authority has already missed the window to enact the Advisory Board's FY18 recommendation for TRAC fees. By moving on TRAC fee adjustments as soon as possible, the financial benefits to ratepayers associated with TRAC can be more predictable more less sustainable.

The Advisory Board recommends that the MWRA staff work with Advisory Board staff to determine the best "target" level for cost-recovery of the TRAC program. Additionally, the Advisory Board recommends identifying and implementing an automatic escalator to make fee increases sustainable and predictable

[12] Both calculations include labor overhead costs.

[13] Personnel costs include wages and salaries, overtime, and fringe benefits.

for the permittees. The Advisory Board further recommends that the new increased fee structure and automatic escalator be in place by July 1, 2019.

Investment Income

- FY15 and FY17 are the only years that investment income were below $10 million since before FY90 when the Authority first issued its own debt. Theses historically low levels were due to:
- Assumed short-term interest rates of 0.20%
- Lower average balances in both short-term and long-term investments
- Lower average fund balances in the construction fund
- FY19 proposed investment income: $12.5 million
- Increase from FY18: +$2.3 million (+22.1%)
- Due to recent increases in short-term interest rates, the Authority has increased its short-term interest rate assumptions from 1.05% to 1.50%
- While the Advisory Board acknowledges that interest rates are increasing and supports increasing this assumption, we would prefer a less aggressive assumption for FY19

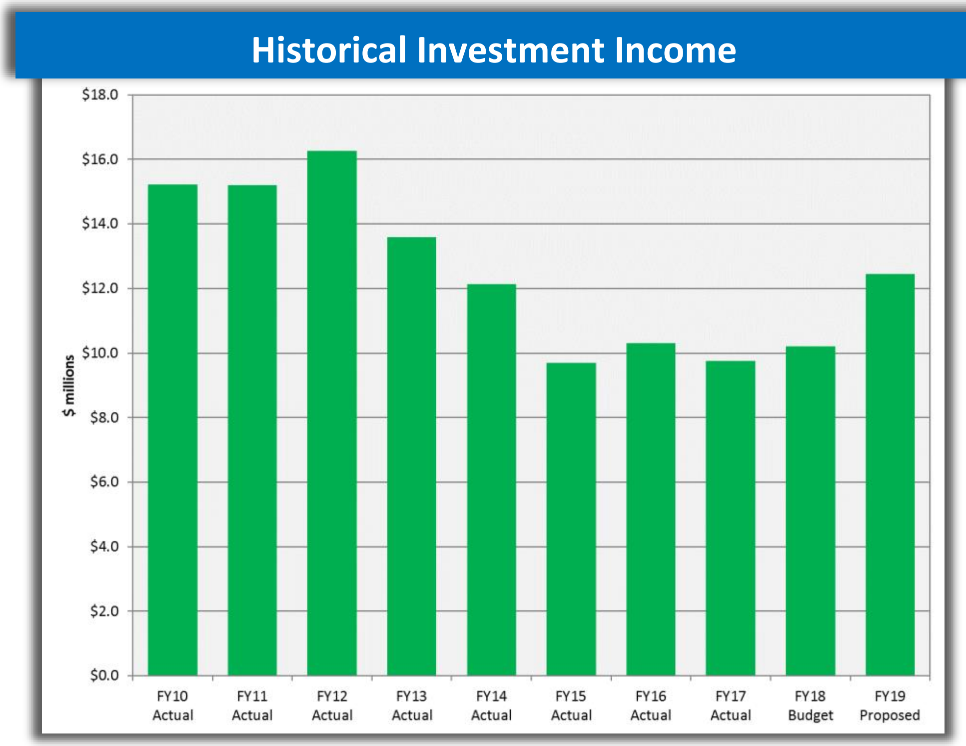


Figure 52

The Advisory Board, therefore, recommends reducing interest income revenue by $1 million.

Debt Service Assistance

- Debt Service Assistance (DSA), when available, is treated as an offset to debt service
- No DSA was assumed in the proposed FY19 CEB
- Since 2004, the Authority has received 79% of the statewide DSA funds available
- In FY18 DSA was funded at a statewide level of $1.1 million
- The MWRA received its share of DSA in the spring of FY18 totaling $944,726

In keeping with the policy advocated by the Advisory Board to "Pay It Forward" to the next budget year, the Advisory recommends that $944,726 be used to directly reduce the rate revenue requirement for FY18.

Long-Term Rates Management

"2.4 by '24"

In Brief

The Authority met the most recent rates goal ("Four No More") set by the Advisory Board over the past five years. This year, the Advisory Board issues a new rates challenge: reduce rate increases in FY19-23 to below 3.5% and achieve flat 2.4% rate increases by FY 2024.

In Depth

When issued the challenge "Four No More", the Authority worked diligently and achieved the goal of keeping rate increases below 4%. By using several tools – defeasance and optional debt prepayment among them.

Last year, however, the Advisory Board indicated that while "Four No More" was a challenge when first issued, and was a good mantra for the time, times had changed. The question became: what's after "Four No More"? This year's review provides our response.

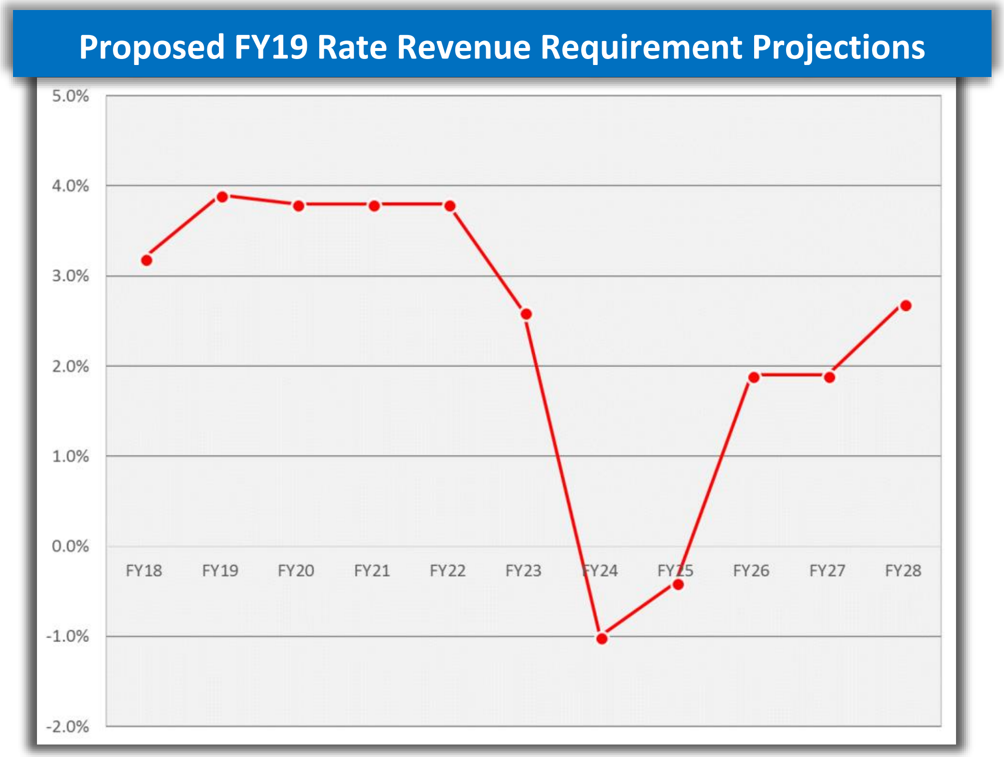


Figure 53

First, let's look at the current planning projections (See Figure 53).

The next five years (FY19-23) feature rate increases in the high 3% range; FY24 and FY25 appear to be rate **decreases** followed by smaller rate increases from FY26-28. The takeaway from this image is that the challenging years – from a rate increase perspective – are between FY19-23. Moreover, how these years are handled will set the stage for the five years after.

During its review, the Advisory Board explored whether there was a way to "save it forward," meaning was there a way to use the available tools to provide rate relief for communities in the early, more challenging years and preparing for the years beyond. Here we will demonstrate the approach we took to achieve rate increases below 3.5% from FY19-23 and to hold rate increases from FY24 and beyond at 2.4%. It is important to note that our scenario does not change any assumptions in the Authority's projections – including future interest rates, inflation rates, future surpluses or defeasances – beyond those specifically mentioned. If any of these changed, it could make attaining this goal even easier.

In Figure 55 we remove the direct and indirect expenses from the Authority's planning estimates to allow us to focus on capital financing expenses.[14] The full stacked bars are the amount of capital financing expenses the Authority has in its planning estimates.

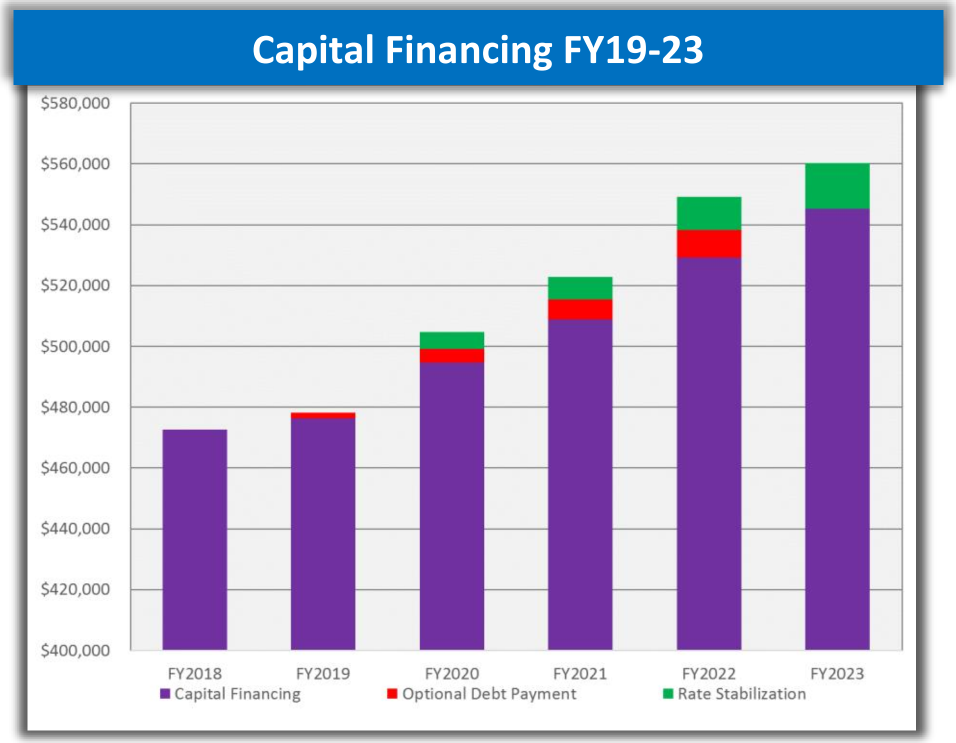


Figure 55

From FY19-23, the red portion of the stacked bars indicates optional debt prepayment. Beginning in FY17, the Authority began using optional debt prepayments as one of its tools to manage future rates. This tool has helped to manage the "peak" of the mountain of debt we have been climbing and will continue to climb through FY23. We firmly believe that this is a powerful tool the Authority has used and will need to use to help with long-term rates management; however, we suggest that rethinking the timing of debt prepayment could provide greater benefits to the Authority's long-term rates strategy, as we'll demonstrate.

As noted in the Capital Financing chapter, the Advisory Board leaves $10.9 million of the proposed optional debt payment in the FY19 CEB. In Figure 55, the small red bar in FY19 indicates the $1.6 million reduction we recommended.[15] The larger bars in FY20-23 indicate the optional debt prepayments embedded in the planning estimates, beginning at $4.5 million in FY20 and capping at $9 million in FY23. Removing these optional payments reduces the rate revenue requirement in these years; however, it is not enough to reduce rates below the 3.5% target.

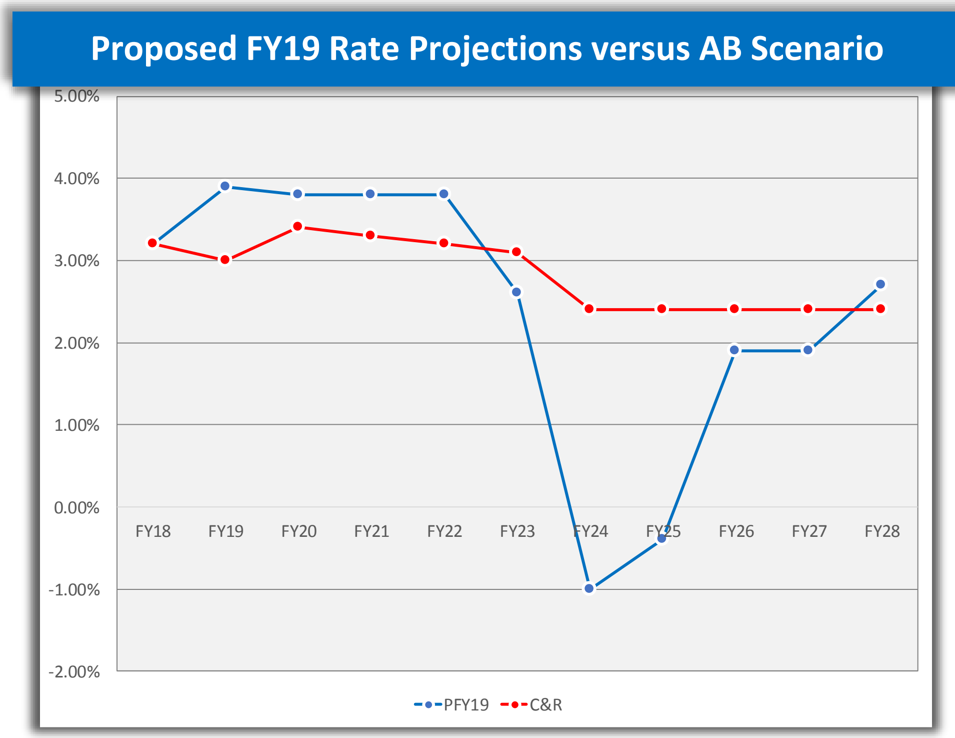


Figure 54

The green bars in the chart indicate a strategic use of rate stabilization funds

[14] The Y-axis scale of the chart has been adjusted to better demonstrate the change in capital financing expenses between the years shown.

[15] Reducing the amount of optional debt prepayment in FY19 slightly increases expenses FY20-23 in the planning estimates. This chart includes those increases.

to further reduce the capital financing expenses in these years.[16] It's important to remember what rate stabilization funds are and what their purpose is. Rate stabilization funds total $62.6 million were raised from community assessments, and placed into segregated accounts awaiting their use. The explicit purpose of rate stabilization funds is to stabilize rates. As we have indicated, the most challenging rates in the 10-year projection are FY19-23, and reducing rates in these years helps to mitigate FY24-28, which we will discuss in detail. We note that this scenario uses about $39 million in rate stabilization funds, leaving $23.6 million untouched; moreover, our scenario includes a plan to restore these rate stabilization funds in future years. With our support, the Authority has avoided using rate stabilization funds in the past several years. We know one response to this proposed use of rate stabilization will be concern about the rating agencies' reactions. As a counterpoint, we note that these funds are being used strategically and specifically for their intended purpose in the years that need the most assistance and include a plan to restore them after their use.

Removing the optional debt payments and strategically using rate stabilization funds allows us to reduce projected rate increases from FY19-23 to below 3.5% (see Figure 54).

FY 2024 – FY 2028

We now turn to the five years following the final climb "up the mountain", to the two years where there appeared to be rate decreases. The most important thing to understand is that there will never be a rate decrease in these years. The projections are just the paper exercise showing what rates would be in these years without any strategic adjustments made.

The Advisory Board has, for years, been the champion of the "sustainable and predictable" rate increases for communities, and the Authority has worked hard to achieve this goal. Providing communities with a negative rate change for two years and then reinstating increases would cause havoc for them locally. Ratepayers, unfortunately, won't remember the years their bills decreased– they will only remember the year they suddenly went up again.

Because of this, as we approach these negative rate change years, some strategy will need to be adopted to ensure these rates remain sustainable and predictable, as well as – we would argue – more reasonable at 2.4%, below the Proposition 2 ½ limits on communities' tax revenue increases.[17] Our approach in the first five years

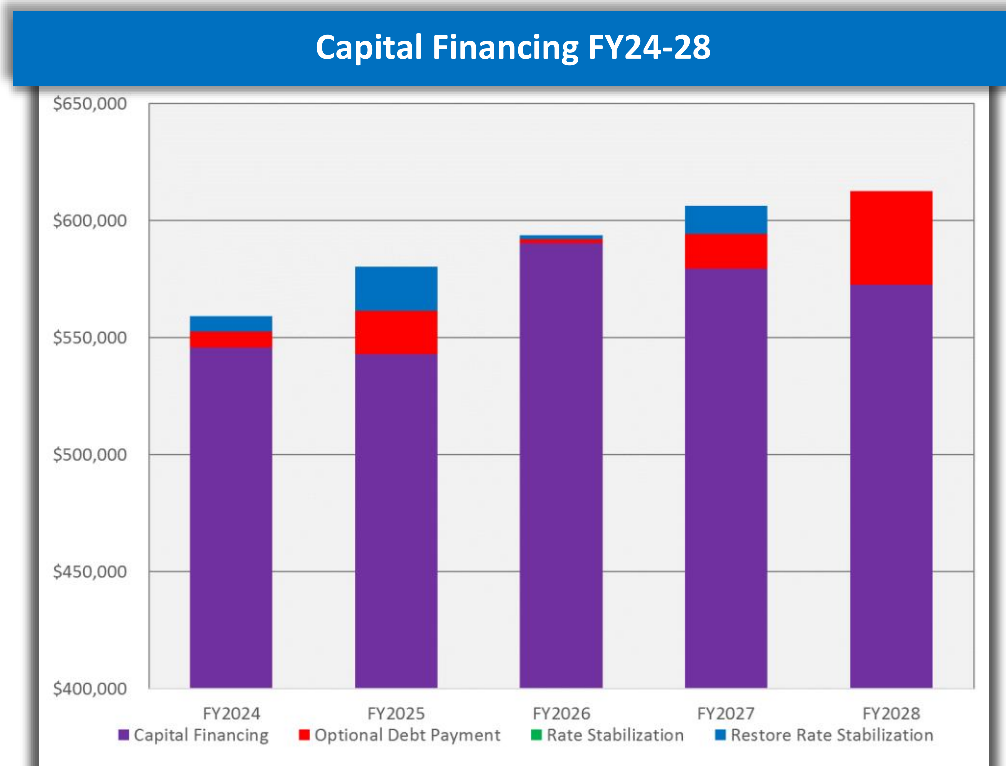


Figure 56

[16] For the purposes of simplicity, we intentionally conflate rate stabilization funds and bond redemption funds into the aggregate term "rate stabilization funds." There are $36.5 million in rate stabilization, and $26.1 million in bond redemption funds.

[17] Barring an operational override or a debt exclusion.

(FY19-23) dovetails nicely with this strategy for the negative rate changes to meet this goal. Let's examine why.

The only way to take a rate decrease and make it into a rate increase is to add spending to the budget for that year. Further, the higher the spending in FY23, the more spending would need to be added to the negative year to achieve a rate increase. Using the Authority's original projections, it would take nearly $30 million in additional spending to achieve a 2.4% rate increase in FY24. In our scenario, because we lowered the spending levels for the prior five years, only $13.5 million would need to be added in this year to achieve the same.

Figure 56 shows our scenario for the kinds of spending to add in the FY24-28 period. The purple bars are the capital financing expenses as they exist in the current projections. The additional funds added to these five years to achieve sustainable, predictable (and reasonable) rate increases of 2.4% have been divided between the blue bars and the red bars in Figure 56. The blue bars represent a replenishment of the rate stabilization funds that were used in FY19-23. As you can see, our scenario fully restores the $39 million previously used by FY27. The red bars represent optional debt prepayments.

Our scenario addresses one of the concerns of the approach to the FY19-23 period, which is the drawdown of a large portion of rate stabilization funds. However, this scenario demonstrates that strategic use of rate stabilization during the more challenging years combined with a plan to restore the funds in the less challenging years could both provide rate relief to communities in the near term and provide even more sustainable and predictable rates in the future.

Further, our approach underscores our support for the use of optional debt prepayment as a tool. We do not simply remove all debt prepayment, but rather realign the timing of this tool to better target the years where there is greater capacity to use it. We remove optional debt prepayments in the more challenging years and re-implement the tool in the less challenging years.

The Advisory Board recommends that the Authority work toward the rate requirement increase levels detailed above, and target 2.4% rate increases by the year 2024.

In Conclusion

Having walked through the details of our proposal and learned the specifics of both the challenges and the tools, let's review the basics of the approach:

1. The next five years (FY19-23) are the most challenging, with the highest levels of rate increases of the 10-year projections
2. There cannot be a rate decrease in FY24 and FY25 as projected, so a strategy must be used to achieve sustainable and predictable rate increases in these years
3. Lowering spending and rate revenue requirements in FY19-23 helps with this strategy to manage the negative rate change
4. Removing the optional debt prepayments and strategically using rate stabilization could reduce rates below 3.5% from FY19-23
5. Using the "capacity" of the negative rate change years, rate stabilization funds used can be restored, and optional debt prepayments reinstituted in FY24.
6. Rate increases under this scenario level at 2.4% from FY24 forward

A few final notes and caveats are warranted. First, our scenario is just that – one scenario of many that could potentially achieve the same result. Second, we do not make any changes to the Authority's assumptions in the projections except for those mentioned above. Included in this are inflation rate assumptions and interest rate assumptions. We do not assume any future surpluses or impacts of any defeasances beyond those already embedded in the projections. We mention this to emphasize that there are many other tools beyond those we used to achieve the end goal. We have laid down the challenge and look forward to working with the Authority using all the various tools at its disposal to meet this new challenge.

Pension and Other Post-Employment Benefits

"They Just Keep Moving the Line"

In Brief

Buying into the Authority's approach of considering both pension and OPEB as one total liability or "two sides of the same coin" as it were, the Advisory Board's recommendation had been to aggressively fund the pension and when fully funded to begin funding OPEB. In FY 2016, the MWRA informed the Advisory Board that the retirement fund was at what they called "virtual full funding."[18] Believing this to meet the Advisory Board's criteria, we supported the Authority establishing an irrevocable trust and beginning to fund the OPEB liability at 50% of the ACC.[19] Yet, this year the pension payment increased from $3.3. million to $7.1 million. Meanwhile its OPEB contribution continues apace at 50% of the ACC at $5.6 million. Moreover, future pension costs climb even higher through FY24. We believe addressing these increasing and unpredictable costs requires a strategic multi-year approach to provide predictability to pension expenses including an extension of the full funding schedule. Absent this and because we cannot reduce the calculated pension contribution, we instead recommend reducing the OPEB liability by $3.7 million in FY19 until a new multi-year approach is adopted.

In Depth

<u>The History</u>

The Authority's approach to the retirement fund has been aggressive over the years. As Figure 57 shows, up to 2005, the Authority was at 100% funding for its retirement fund; however, a change in valuation methodology at that time suddenly dropped the MWRA's funding ratio to 82.7% in 2007. In 2007, only at the Advisory Board's appeal, did the Retirement Board extend the full funding date of the pension from to 2018 to 2024 to provide some relief for communities and ratepayers. At that time,

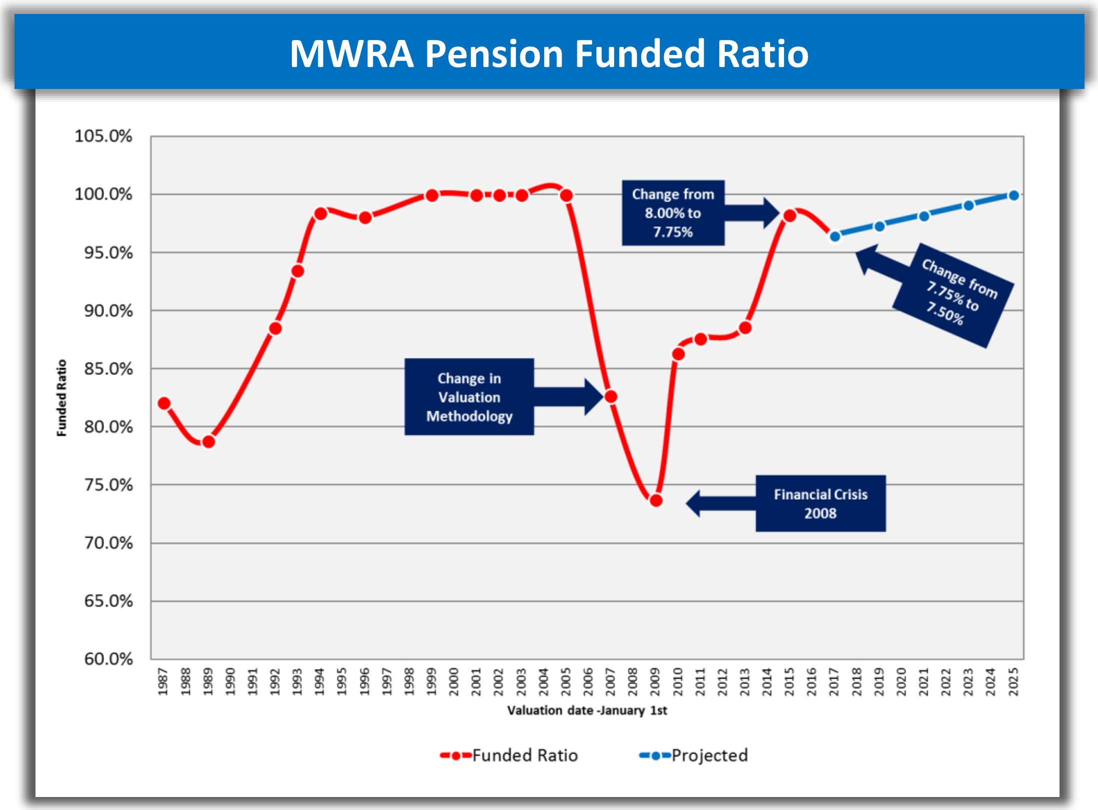


Figure 57

[18] Virtual full funding is defined as the range between 95%-105%. As of the time of this writing, the Authority is 96.5% funded.

[19] The Advisory Board refers to the OPEB payment as the Actuarial Calculated Contribution (ACC) to emphasize that there is currently no requirement to fund OPEB. The Authority refers to this calculated amount as the Annual Required Contribution (ARC).

all entities in the Commonwealth could choose a full funding date as late as 2028, which was further extended to 2030 in 2009. In 2010, the Commonwealth issued a new Municipal Relief Act that allowed governmental entities to further extend their full funding dates to 2040. That the MWRA chose a funding date earlier than the latest date allowed and maintaining it demonstrated its aggressive approach to funding the pension early on.

When the financial crisis hit in 2008, the funded ratio dropped to 73.8%. Meanwhile, the pronouncement of GASB45 required the Authority to calculate and disclose its other post-employment benefits (OPEB) liability in its financial statements for the first time. The Authority recommended prefunding the liability to prevent it growing and to realize some projected savings. The Advisory Board remained opposed to funding the OPEB liability at that time because there was no requirement for the liability to be funded (unlike the pension fund) and because very few public entities, from communities to quasi-state agencies, had made any payments toward this liability. The concern was also raised that placing funds in an irrevocable trust would make it inaccessible to the Authority if further need (i.e. another market dislocation) should arise.

Pension, Optional Payment, OPEB Historical

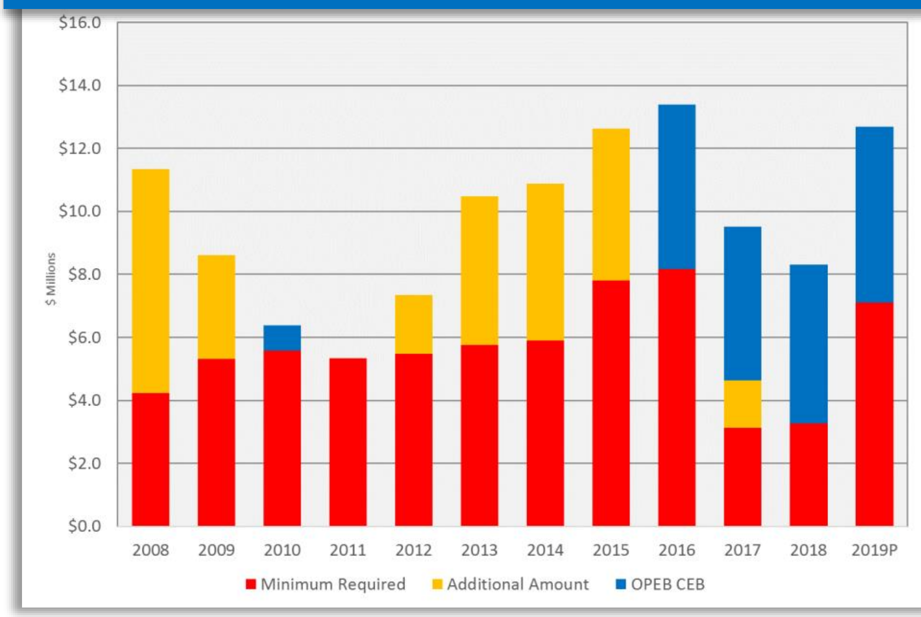


Figure 58

In 2008 the Authority presented to the Board of Directors an approach designed by Buck Consultants that described the combined pension and OPEB liabilities as one total liability owed to retirees, describing them as "two sides of the same coin." According to this view, any dollar invested in either liability counted equally, so rather than split funding between the two different liabilities, the Authority would instead concentrate on funding its pension liability. To demonstrate the understanding that the OPEB liability would need to be addressed, the MWRA would typically budget for the full pension Annual Required Contribution (ARC) and 50% of the OPEB Actuarial Calculated Cost (ACC). The Board of Directors would then vote to redirect the OPEB funds to the pension fund. The result was that over several years beginning in 2008, the Authority made not only the pension's ARC but also optional pension payments above and beyond the ARC (see Figure 58), all while maintaining the aggressive 2024 funding schedule. Through FY17, the Authority made over $28 million of optional payments to the pension. The 2024 schedule combined with these "over and above" pension payments comprised what the Advisory Board viewed as a very aggressive approach to the pension.

The Advisory Board supported the one total liability approach, and even endorsed the aggressive pension funding plan. The Advisory Board's recommendation during these years, which the Authority bought into, was to continue aggressively funding the pension and **only when fully funded** begin funding the OPEB liability.

In FY 2016 the Authority reported that the pension fund was at 98.3% liability. Moreover, they reached out to their consultants to see what comes next, since there were no examples of other agencies as well funded as the Authority. The big question was at what point could the Authority consider itself fully funded, since 100% funding is virtually impossible to achieve and maintain. The reasoning behind this was, even if the Authority's contribution to the retirement fund brought it to the 100% level on the dollar, almost instantaneously that amount would change. The retirement fund contains several categories of investments, which change value daily. The next day that 100% could be 101% or 99% depending on how these investments performed from one day to the next. The consultants informed the Authority that the consensus among actuarial consultants was to regard 95%-105% as a range called "virtual full funding." The Authority bought into this concept and reported that this "virtual full funding" meant they had achieved their target and could now begin funding the OPEB liability. The Advisory Board also bought into this concept and endorsed the change in strategy that would allow the budgeted OPEB funds to address the OPEB liability rather than serve as additional pension payments.

In FY 2015 the Authority established an irrevocable trust for OPEB funds and chose to invest the funds with the Massachusetts Pension Reserve Investment Trust (PRIT). As of the time of this writing, the OPEB trust contains $24.9 million.

In September 2017, Advisory Board staff met with MWRA staff, some Retirement Board members, and the Authority's actuarial and investment consultants to discuss the outlook of future pension payments. The results were surprising.

The pension's biennial valuation includes many assumptions when calculating the ARC and projecting future years' contributions. One key assumption is the assumed rate of return on the retirement fund's investments. This rate of return is calculated on a 20-year historical basis and had been carried at 8% as late as the valuation conducted on 1/1/15. The valuation of 1/1/16 lowered this rate of return to 7.75%, and the 1/1/17 valuation lowered it further to 7.5%.What this means is that the valuation assumes the fund will make less money on its investments, which causes the ARC to increase. Further, between 2014 and 2016, the actual returns on the MWRA's investments had been below the 7.75% rate of return (see Figure 59), creating a higher unfunded liability and creating upward pressure on the ARC.[20] These lower years of gains combined with the reduction in the assumed rate of return were major contributors to the increase in proposed pension expenses for FY19 (see Figure 59) and beyond.

[20] The pension uses five-year smoothing to help mitigate market volatility, so only 20% of any gains or losses in a given year are recognized in the annual required contribution.

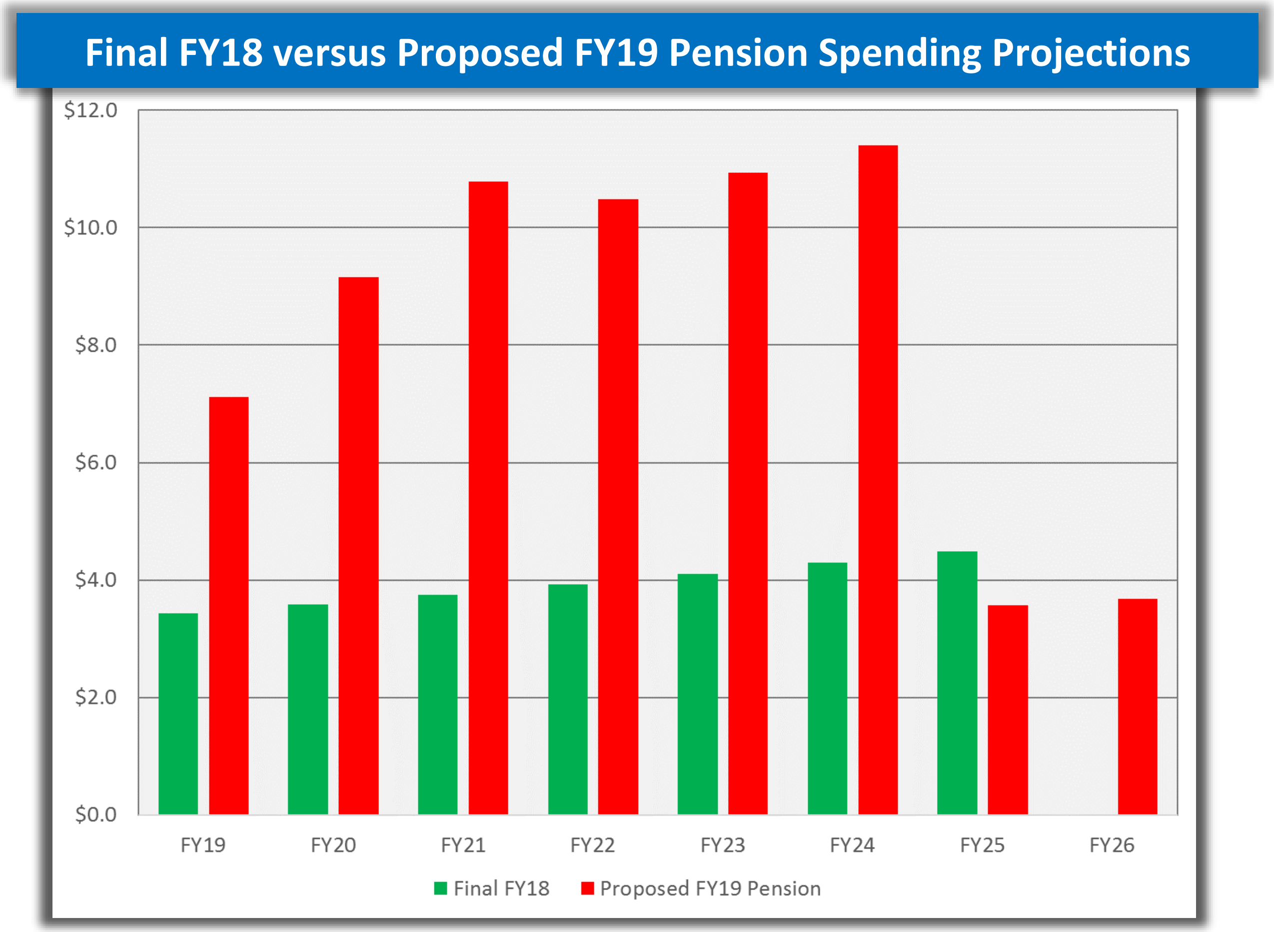


Figure 59

In FY19 the pension fund increased from $3.3 million in FY18's final budget to $7.1 million in FY19's proposed budget.[21] More disturbing are the upcoming future years – the very years we have flagged as the most challenging rates-wise for communities – from FY19-24. Another factor that compounds the problem is the Authority's aggressive pension schedule – when investments underperform, it adds to the overall unfunded liability of the pension, increasing the ARC in future years; however, the Authority now has very few years across which to spread this increased liability.

Because the Authority had experienced greater returns than anticipated in 2017, a full valuation was conducted on an "off year" – 1/1/18. At the time of this writing it should increase the actual rate of return for 2017 to about 14%, which would help to lower the ARC for FY19.[22]

It has come to our attention, however, that there are active discussions about further lowering the discount rate of return. These changes would cause the pension's ARC to increase beyond the already high levels currently projected. We discuss this in greater detail below.

<u>Advisory Board Position</u>

[21] The 1/1/17 valuation would have made the MWRA's FY19 pension expense nearly $8 million; however, the Authority used a pro-forma valuation as of 1/1/2018, which included 12.4% asset return. The final, full 1/1/2018 is expected to increase that rate of return further.

[22] Due to the five-year smoothing methodology, only 20% of the 14% returns will be recognized, so the results will lower the annual requirement, but not dramatically.

Advisory Board staff was surprised at the dramatic increase in pension costs, especially after proclaiming with the Authority that the MWRA had achieved the "virtual full funding" milestone, which met the threshold for establishing an OPEB trust to address that unfunded liability.

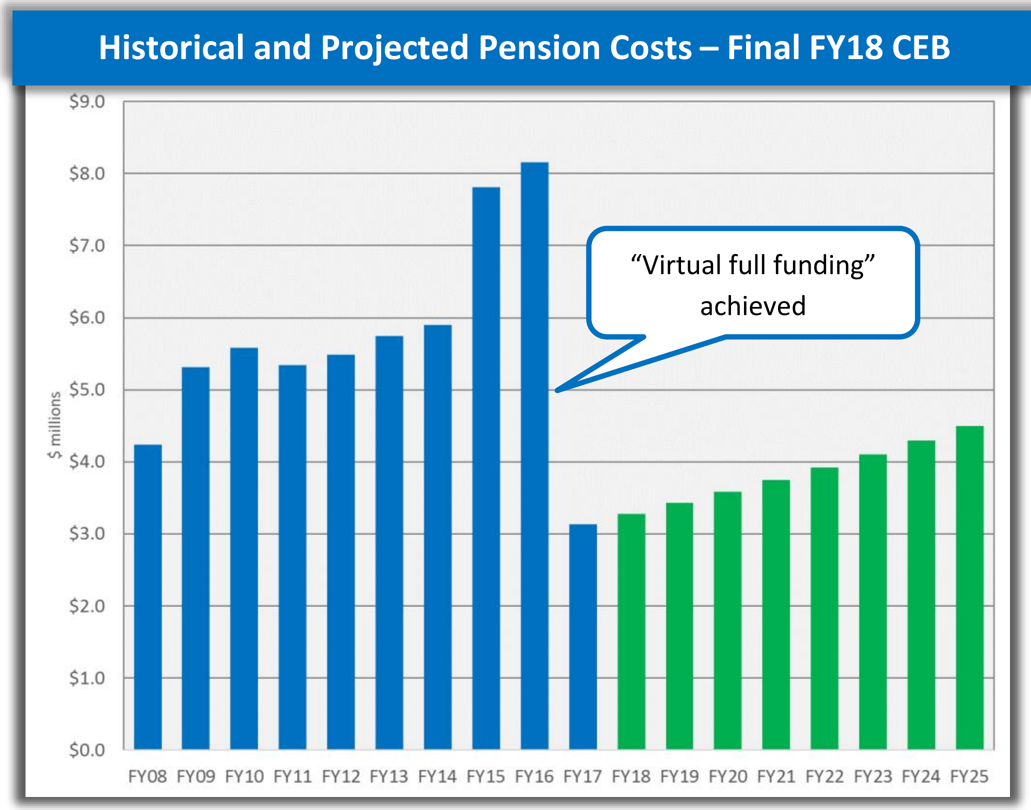


Figure 60

In fact, if you look at the actual and projected pension costs moving forward (Figure 60), it appeared that once we had achieved "virtual full funding" pension costs would drop to a much lower level – something you would expect after addressing the large unfunded liability upon reaching full funding. Indeed, if you look at the proposed FY19 pension expense projections, the exact same trend occurs in FY24 – the year the pension achieves **actual** full funding. (see Figure 60)

Given this matching trend, it is easy to understand our surprise at the sudden increase from the prior year's projections, and our belief that the lower trend would continue beyond FY18.

As noted, the original recommendation was to only begin funding OPEB once the pension had reached full funding. It is counterintuitive and unerving that the MWRA's and the communities' "reward" for achieving this high mark are dramatically higher costs moving forward. It should also be noted that the MWRA is an outlier amongst Massachusetts pension systems. As of April 2018, MWRA's funded ratio of 96.5% is followed by the City of Leominster at 90.1%, with every other pension fund below 90%.

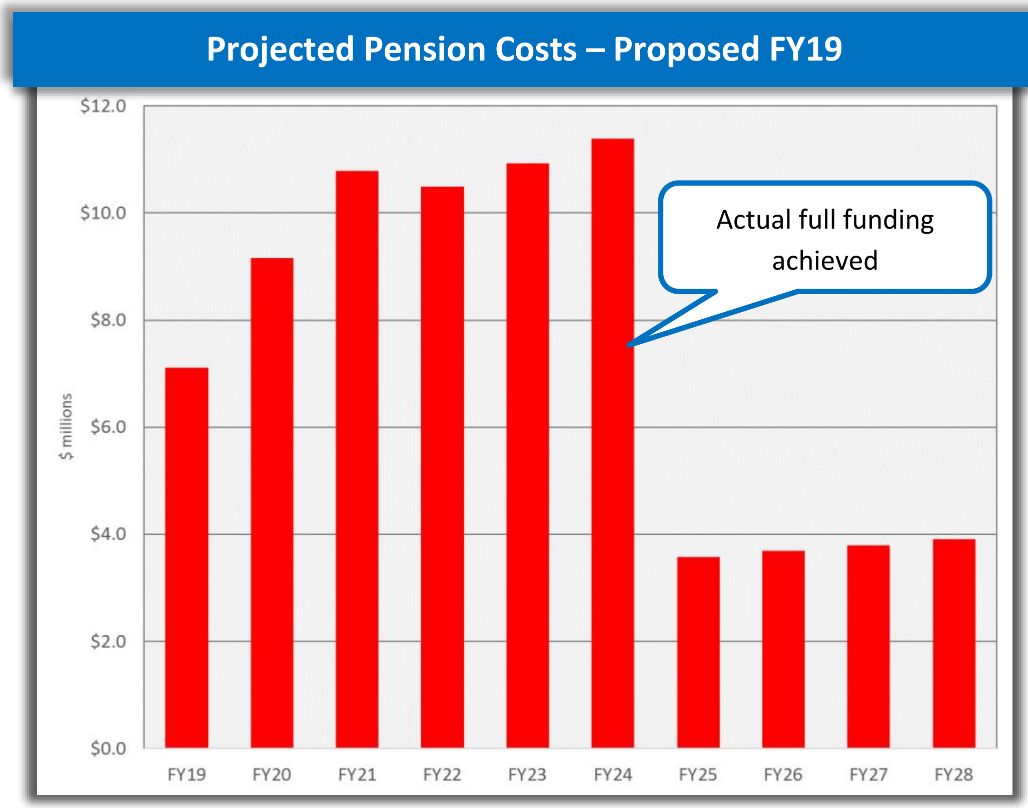


Figure 61

While the Advisory Board fully expects pension and OPEB costs to change from year to year, and even to increase when new valuations are performed, we expected the levels of spending to hew closer to the FY18 projections (see Figure 61). To put this in context, the FY18 projections show the Authority spending $27.6 million through FY26, where the proposed FY19 shows the Authority paying $67.1 million. This, during the period that is most challenging for ratepayers according to the ten-year projections.

Toward that end, we are adopting an either/or approach to pension and OPEB expense. On the one hand our recommendation would provide some relief for the communities in FY19 to bring funding levels for these line items down to last year's level, absent any other changes to pension expenses and projections moving forward. Alternatively, the Authority could adopt a multi-year approach that provides more budget certainty on annual costs (i.e. keeping cost increases more reasonable from year to year), while still meeting all the Authority's obligations responsibly.

FY19 Recommendation

Unfortunately, we cannot recommend a reduction to the proposed FY19 pension expense. It is the PERAC-approved funding level according to the 1/1/17 valuation, and MWRA is obligated to pay it. There may, as we noted before, be an opportunity to reduce this funding level slightly using an updated 1/1/18 valuation that would include favorable returns for 2017.

The Advisory Board expects and supports the Authority to reduce the FY19 pension fund expense according to the updated actuarial calculations.

Funding OPEB, however, is not required. The Advisory Board acknowledges and has always acknowledged that the MWRA's OPEB liability is very real, very large, and must be addressed; however, we have always attempted to balance the approach and spending on OPEB with the costs to communities and ratepayers. We stand by our approach to redirect the funds to the pension until it was fully funded – a level we thought we had achieved in FY16. Once again, viewing the pension and the OPEB as one total liability, we cannot ignore the $3.8 million increase over FY18 if a multi-year approach to address the further dramatic levels of pension expense through FY24 is not implemented.

Therefore, the Advisory Board recommends reducing other post-employment benefits expenses by $3,681,945, unless a multi-year approach that addresses future pension expenses is adopted, such as one presented below.

We cannot reduce pension, but we can reduce OPEB as a tool to provide short-term relief to communities in FY19. We arrived at this number by subtracting FY18's projected FY19 pension expense ($3.4 million) from the $7.1 million in the proposed FY19 budget.

Beyond FY19

As noted, the Advisory Board's review this year is characterized by a multi-year point of view and we would prefer a multi-year solution to pension costs moving forward. The proposed FY19 projections include nearly $60 million in pension costs through FY24. If we add on OPEB projected expenses, this total climbs to $96.7 million (See Figure 62). We believe there is a way to balance these costs within the broader context of rate impacts on communities.

There are many different tools that can be used and adjustments that can be made that could provide some of this relief. An obvious one is exercising the option to extend out the schedule of repayment. Massachusetts public systems can extend their funding schedules as far out as 2040. Even a funding date earlier than 2040 but later than 2024 would surely provide some relief on the annual costs. Moreover, it's plain to anyone reviewing the Authority's history and financials that this move would not be undertaken without clear reasons and justifications. The fact of the matter is, the Authority is the most well-funded retirement system within the Commonwealth of Massachusetts. Some credit needs to be given that they have achieved this milestone. Extending the schedule would be done both to provide rate relief for communities, as well as to free up budget capacity to allow the Authority to continue addressing its OPEB liability.

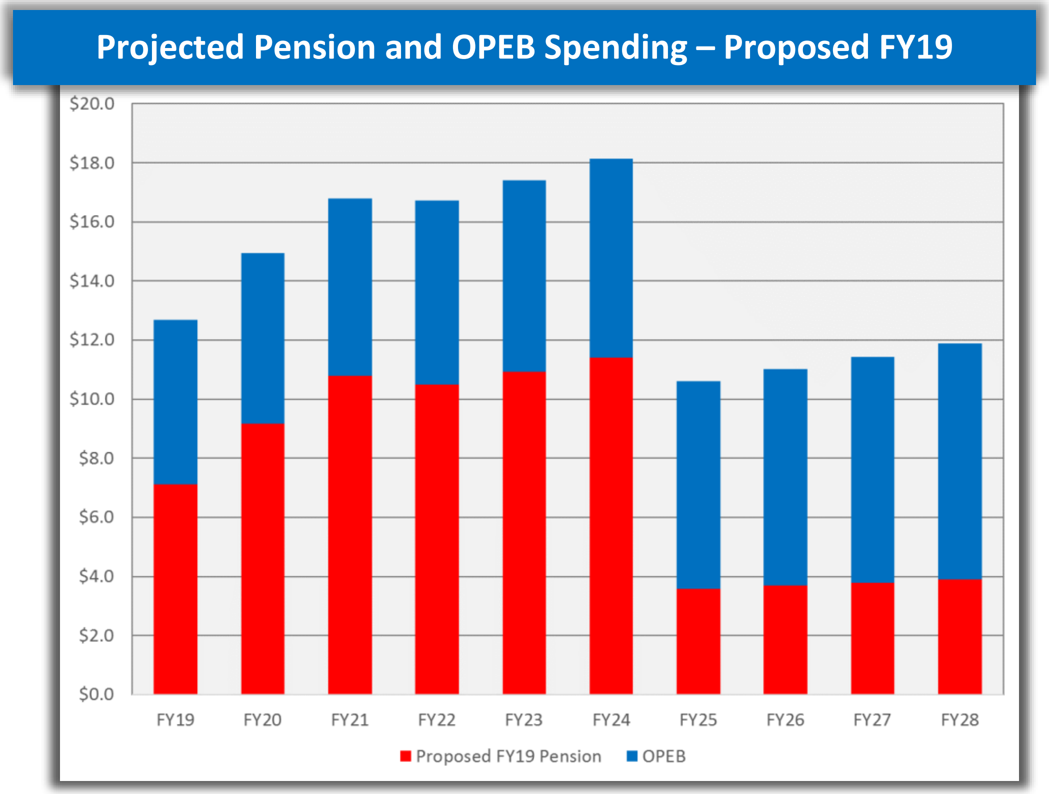


Figure 62

There are other more esoteric tools that can be assessed as well and are beyond the scope of this review; however, the projected funding levels demand some sort of comprehensive plan. As noted before, there are active discussions at the Retirement Board to further lower the assumed rate of return from 7.5% to 7.25%. While this reduction may be the right thing to do, we argue that the timing of doing so is critical. Making this adjustment before the final FY19 CEB would likely increase pension expense beyond the $7.1 million in the proposed budget.

MWRA staff has provided the Advisory Board with a draft projection of pension expenses should the schedule be extended to FY28 – providing four additional years to achieve actual full funding – while leaving the assumed rate of return at 7.5% for now. (See

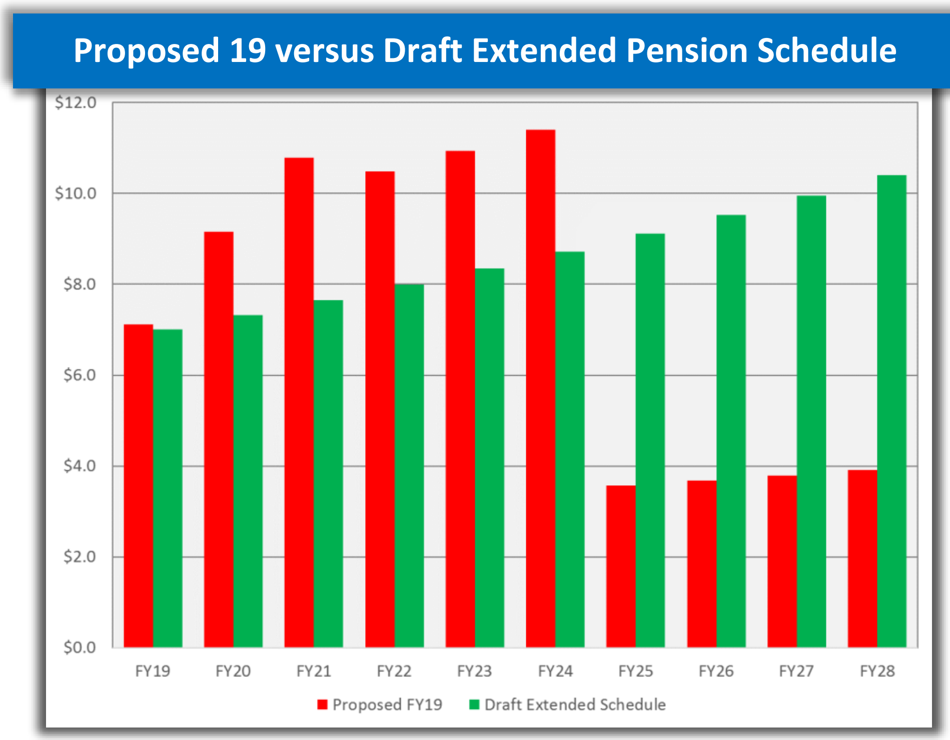


Figure 63

Figure 63) As you can see, the increases are much more sustainable and predictable year over year at a flat increase of 4.5% per year. In dollars, at no point does the increase go over $500 thousand before 2028. It should be noted that due to the additional observed returns in 2017, the FY19 pension cost under the draft extended schedule would be $7 million versus the $7.1 million in the proposed FY19 CEB. We believe this draft extended schedule is a reasonable compromise that provides a solution to the Advisory Board's biggest concern: dramatically high levels of spending and unpredictable increases over the next six years.

The Advisory Board therefore recommends that MWRA staff recommend to the Retirement Board a schedule extension to 2028 while keeping the assumed rate of return at 7.5%. Should this schedule be adopted, the Advisory Board withdraws its recommendation to reduce OPEB by $3,681,945, and instead reduce the optional debt payment by an additional $3,681,945 beyond the Advisory Board's prior recommendation.

In Conclusion

The Advisory Board has supported the MWRA's aggressive approach toward funding the pension; however, the high levels of projected pension expenses beginning in FY19 combined with unpredictable increases from year to year through FY24 require a strategic multi-year approach. The Advisory Board seeks to either extend the full funding date of the pension and provide sustainable and predictable year-over-year increases to this expense, or to provide relief in FY19 by reducing the OPEB contribution until a comprehensive multi-year plan can be implemented.

Wastewater Primacy

"Still in The Minority"

The Advisory Board continues to advocate for Massachusetts to obtain delegated authority, or primacy, over NPDES permits. Along with Idaho, New Hampshire, and New Mexico, Massachusetts remains just one of four states that must obtain water quality permits from EPA. Primacy would allow Massachusetts communities to work with MassDEP to achieve compliance as written in the permits, a decided advantage as MassDEP is more attuned to the needs of Massachusetts municipalities.

Devising a funding strategy remains a significant hurdle to state primacy implementation, however. Over the past year, the Advisory Board met with the State Auditor and Conservation Law Foundation to try to find common ground and get the ball rolling. Unfortunately, the issue did not gain traction in the legislature and the measure was unsuccessful. The Advisory Board will continue to prioritize primacy, particularly as MS4 permits for stormwater are expected to come into effect on July 1, 2018.

We reiterate our belief that some dedicated funding mechanism via a fee structure where all stakeholders contribute is critical to any success of MassDEP assuming delegated authority over the NPDES program. (See *Proposed FY18 Integrated Comments and Recommendations*)

The Advisory Board expects to work closely with the MWRA and all stakeholders to help MassDEP assume NPDES delegation.

Symbolic Lights

"A Light at the End of Deer Island"

Last year we made a recommendation to place LED lighting on the Deer Island digesters similar to the lighting found on the Zakim Bridge. The digesters already stand out and are a highly recognizable landmark in Boston Harbor, particularly flying in and out of Logan Airport.

Having seen projected costs for this project and concerned that they were much higher than anticipated, the Advisory Board does not anticipate and/or support this project being funded through the MWRA's budget at that level. The Advisory Board if nothing else is consistent in its message of minimizing impacts on ratepayers funding. However, that raises the question: are there outside sources of funding that we/MWRA should be pursuing? Are there opportunities for a public/private partnership which would allow for another visually pleasing landmark to the Boston skyline?

The Advisory Board recommends that MWRA reach out to other entities such as arts councils, non-profits, and perhaps local businesses to donate funding to help install color accent lights on the Deer Island digesters.

List of Appendices

Appendix A

List of Recommendations

1. The Advisory Board recommends the proposed Phase 11 and 12 funding level of $120 million be increased to $200 million. As well as the installation of a $100 million dollar, 10-year, interest free interim loan program for communities seeking additional funding prior to the conclusion of Phases 11 and 12. The program would have the same allocation methodology of the traditional I/I program and aide communities that aggressively utilize I/I funding before new phases are implemented.

2. The Advisory Board recommends reducing the FY19-23 capital spending cap to no greater than $950 million.

3. The Advisory Board recommends reducing the FY19 Rate Revenue Requirement by $6,010,531 resulting in a combined wholesale assessment increase of 3.07%, the lowest rate increase in six years.

4. The Advisory Board recommends reducing the optional debt pre-payment by $1.6 million to level-fund this line item from FY18.

5. The Advisory Board recommends reducing the variable rate debt interest rate assumption to 3.25%, and the variable rate debt line item by $1 million to reflect this change.

6. The Advisory Board recommends that the Authority explore the potential financial gains from using taxable bonds on appropriate capital projects, such as the Lead Loan Program and the purchase of the railroad near Wachusett Reservoir.

7. The Advisory Board recommends that the Authority adopt a long-term, 40-year debt structure to fund the Metropolitan Redundancy Tunnel and other projects with long useful lives.

8. The Advisory Board recommends that the Authority adjusts its attrition/vacancy rate assumptions upward by $950,000 (includes associated fringe benefits).

9. The Advisory Board recommends reducing other post-employment benefits expenses by $3,681,945, unless a multi-year approach that addresses future pension expenses is adopted.

10. The Advisory Board recommends that MWRA staff recommend to the Retirement Board a schedule extension to 2028 while keeping the assumed rate of return at 7.5%. Should this schedule be adopted, the Advisory Board withdraws its recommendation to reduce OPEB by $3,681,945, and instead reduce the optional debt payment by an additional $3,681,945 beyond the Advisory Board's prior recommendation.

11. The Advisory Board recommends increasing the "additions to reserves" line item for FY19 by $45,249 to correspond to the recommended reductions in eligible line items.

12. The Advisory Board recommends MWRA remove funding for all Watershed Division capital projects – both in the CIP and as part of the Watershed Reimbursement CEB line item – until either insurance or an insurance reserve funded by the Commonwealth is established for the state buildings and equipment in the watershed.

13. The Advisory Board recommends removing treatment of enterococcus from the FY19 budget and reducing the FY19 chemicals budget by $294,006.

Appendix A

14. The Advisory Board recommends that MWRA insist that the final Deer Island permit does not contain any language naming member communities as co-permittees.

15. The Advisory Board recommends that the MWRA staff work with Advisory Board staff to determine the best "target" level for cost-recovery of the TRAC program. Additionally, the Advisory Board recommends identifying and implementing an automatic escalator to make fee increases sustainable and predictable for the permittees. The Advisory Board further recommends that the new increased fee structure and automatic escalator be in place by July 1, 2019.

16. The Advisory Board recommends reducing interest income revenue by $1 million.

17. The Advisory Board recommends applying the MWRA's debt service assistance share of $944,726 received in FY18 towards the FY19 budget to reduce community assessments.

18. The Advisory Board recommends that the Authority work toward the rate revenue requirement increase levels detailed in the Policy Chapter, and target 2.4% rate increases by the year 2024.

19. The Advisory Board recommends that MWRA reach out to other entities such as arts councils, non-profits, and perhaps local businesses to donate funding to help install color accent lights on the Deer Island digesters.

Appendix B

List of Comments

1. The Advisory Board supports the continued use of the defeasance account strategy, which clearly identifies a use of variable rate debt service savings that is consistent with the original intended use of the funds that were raised.

2. The Advisory Board expects to continue working with MWRA staff and MassWorks to dedicate grant funding for communities looking to join the MWRA waterworks system.

3. The Advisory Board expects the MWRA to propose an increase of $113,305 in the "wages and salaries" category of expenses in its final FY19 CEB.

4. The Advisory Board supports continued funding for proposed temporary staffing related to the lead program to assist communities.

5. Based on new data released this spring from the GIC, MWRA projects a decrease of $601,046 from the proposed FY19 CEB. The Advisory Board expects this reduction to be included in the final FY19 CEB.

6. The Advisory Board expects the Authority to increase the "worker's compensation" category of expense by $100,000.

7. The Advisory Board expects the MWRA to increase its overtime budget by $200,000.

8. The Advisory Board expects the Authority to reduce the FY19 pension fund expense according to the updated actuarial calculations.

9. The Advisory Board expects the MWRA to increase its "maintenance" category of expense by $621,145 in the final FY19 CEB.

10. The Advisory Board expects the Authority will decrease the "other services" category of expense by $85,282.

11. The Advisory Board expects the Authority to increase its FY19 CEB "utilities" expenses by an estimated $839,914.

12. The Advisory Board expects that the MWRA will increase the "chemicals" category of expense by $268,602 to reflect updated pricing and usage assumptions.

13. The Advisory Board expects the MWRA to request an increase of the "professional services" category of expense by $58,859 in its final budget.

14. The Advisory Board expects to work closely with the MWRA and all stakeholders to help MassDEP assume NPDES delegation.

Appendix C

IMPACTS ON RATE REVENUE REQUIREMENT		Amount
Final FY2018 RRR	$	717,054,000
Projected FY2019 RRR	$	745,080,300
MWRA Proposed FY19 RRR Increase		**3.91%**
AB Recommendations and Anticipated Adjustments (See Below)	$	(6,010,531)
FY2019 RRR, less changes	$	739,069,770
Advisory Board Recommended FY19 RRR Increase		**3.07%**

IMPACTS ON EXPENDITURES		Amount	Description
MWRA ADVISORY BOARD RECOMMENDATIONS FOR FY19 CEB			
OPEB (Increased Pension adjustment)	$	(3,681,945)	Delta between FY19 and FY18 actuarial pension costs
Optional Debt Pre-Payment	$	(1,600,000)	Level funded from FY18 ($10.9M v. $12.5M)
Variable Rate Debt	$	(1,000,000)	25 bp = $1 million
Staffing (vacancy rate assumptions)	$	(950,000)	9.5 FTE vacancies @ $100K/position
Debt Service Assistance "Pay It Forward"	$	(944,726)	MWRA share of $1.1 million
Enterococcus Compliance	$	(294,006)	3 months in budget
Subtotal AB Recommendations	**$**	**(7,470,677)**	**Includes Short Term Investment Income recommendation from Revenue & Income section**
ANTICIPATED ADJUSTMENTS TO PROPOSED FY19 CEB			
Direct & Indirect Cost Changes			
Fringe Benefits	$	(601,046)	
Other Services	$	(85,282)	
Professional Services	$	58,859	
Workers' Comp	$	100,000	
Wages and Salaries	$	113,305	
Overtime	$	200,000	
Chemicals	$	268,602	
Maintenance	$	621,145	
Utilities	$	839,914	
Subtotal of Changes to Operating Costs	**$**	**1,515,497**	
Capital Financing & Reserve Cost Changes			
Defeasance Impacts Estimate	$	(200,000)	
Refunding Impacts Estimate	$	(120,000)	
Subtotal of Debt & Reserve Costs	**$**	**(320,000)**	
Revenue & Income			
RPS Credits	$	(223,779)	
Power Sales	$	(12,018)	
Demand Response	$	16,396	
Short Term Investment Income	$	(1,000,000)	Advisory Board recommended reduction
Subtotal of Rate & Revenue	**$**	**(219,401)**	**Excludes AB recommendation of Short Term Investment Income adjustment from interest rate assumtion deduction**
OPERATING RESERVE REQUIREMENT ADJUSTMENT			
Operating Reserve Requirement	$	45,249	*Updated based on applicable adjustments; applies only to direct and indirect costs (revenue not included)*
NET CHANGES TO Proposed FY18 CEB	**$**	**(6,010,531)**	

Appendix D

	Total MWRA	FY18 Approved	FY19 Proposed	Change FY18 Proposed vs FY19 Approved Budget $	%
EXPENSES	Wages and Salaries	$104,286,370	$107,118,717	$2,832,346	2.7%
	Overtime	$4,110,637	$4,247,557	136,920	3.3%
	Fringe Benefits	$20,997,975	$21,774,617	776,642	3.7%
	Workers' Compensation	$2,322,980	$2,322,609	(371)	0.0%
	Chemicals	$9,836,934	$10,855,854	1,018,919	10.4%
	Energy and Utilities	$21,735,221	$22,041,917	306,696	1.4%
	Maintenance	$32,200,785	$31,637,581	(563,204)	-1.7%
	Training and Meetings	$406,269	$455,770	49,501	12.2%
	Professional Services	$7,221,622	$7,617,117	395,495	5.5%
	Other Materials	$6,692,661	$7,381,099	688,438	10.3%
	Other Services	$22,764,525	$23,150,694	386,169	1.7%
	TOTAL DIRECT EXPENSES	**232,575,979**	**238,603,531**	**6,027,547**	**2.6%**
	Insurance	2,013,452	2,099,064	85,612	4.3%
	Watershed/PILOT	25,164,006	25,906,428	742,422	3.0%
	HEEC Payment	957,445	1,386,832	429,387	44.8%
	Mitigation	1,596,950	1,614,262	17,312	1.1%
	Addition to Reserves	821,116	1,732,193	911,077	111.0%
	Retirement Fund	3,277,369	7,110,663	3,833,294	117.0%
	OPEB/Additional Pension Contribution	5,035,422	5,574,152	538,730	10.7%
	TOTAL INDIRECT EXPENSES	**38,865,760**	**45,423,593**	**6,557,834**	**16.9%**
	Debt Service (before offsets)	472,188,190	489,206,234	17,018,044	3.6%
	Bond Redemption			-	
	Debt Service Assistance	873,804	0	-873,804	
	TOTAL DEBT SERVICE	**473,061,994**	**489,206,234**	**16,144,240**	**3.4%**
	TOTAL EXPENSES	**$744,503,733**	**$773,233,358**	**$28,729,621**	**3.9%**
REVENUE AND INCOME	Rate Revenue	717,054,000	745,080,300	28,026,300	3.9%
	Other User Charges	9,011,070	9,469,932	458,862	5.1%
	Other Revenue	7,359,078	6,225,720	(1,133,358)	-15.4%
	Rate Stabilization	-	-	-	0.0%
	Investment Income	10,205,781	12,457,408	2,251,627	22.1%
	TOTAL REVENUE AND INCOME	**743,629,929**	**$773,233,360**	**$29,603,431**	**4.0%**

Appendix E
Cap Calculation versus Actual FY04-08 Spending

Final FY04 CIP

Baseline Cap FY04-08 ($ millions)	FY04	FY05	FY06	FY07	FY08	Total FY04-08
Projected Expenditures	$237.0	$190.2	$195.2	$217.3	$183.6	$1,023.3
Contingency	19.4	14.1	15.5	19.8	18.1	86.9
Inflation on Unawarded Construction	0.0	0.8	5.8	13.0	16.1	35.7
Less: Chicopee Valley Aqueduct Projects	(5.4)	(1.5)	(1.4)	(0.1)	(3.0)	(11.4)
FY04-08	**$250.9**	**$203.5**	**$215.2**	**$250.1**	**$214.8**	**$1,134.5**

FY08 Closeout Data

FY04-08 Actual Spending	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Actual	FY08 Actual	Total FY04-08
Projected Expenditures	$194.0	$167.7	$152.3	$177.7	$196.8	$888.5
Contingency	0.0	0.0	0.0	0.0	0.0	0.0
Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	0.0	0.0
Less: Chicopee Valley Aqueduct Projects	(0.4)	(0.5)	(2.4)	(3.3)	(1.8)	(8.4)
FY04-08	**$193.6**	**$167.2**	**$149.9**	**$174.4**	**$195.0**	**$880.1**

Change

Baseline Cap FY04-08 to Actual Spending	FY04	FY05	FY06	FY07	FY08	Total FY04-08
Projected Expenditures	($43.0)	($22.5)	($42.9)	($39.6)	$13.2	($134.8)
Contingency	(19.4)	(14.1)	(15.5)	(19.8)	(18.1)	(86.9)
Inflation on Unawarded Construction	0.0	(0.8)	(5.8)	(13.0)	(16.1)	(35.7)
Less: Chicopee Valley Aqueduct Projects	5.0	1.0	(1.0)	(3.2)	1.2	3.0
FY04-08 CAP Δ ($)	**($57.4)**	**($36.4)**	**($65.2)**	**($75.6)**	**($19.8)**	**($254.4)**
FY04-08 CAP Δ (%)	**-22.9%**	**-17.9%**	**-30.3%**	**-30.2%**	**-9.2%**	**-22.4%**

Appendix E

Cap Calculation versus

Actual FY09-13 Spending

Final FY09 CIP

Baseline Cap FY09-13 ($ millions)	FY09	FY10	FY11	FY12	FY13	Total FY09-13
Projected Expenditures	$230.0	$251.7	$224.3	$196.7	$178.7	$1,081.4
Contingency	15.6	13.8	12.0	12.1	11.4	64.8
Inflation on Unawarded Construction	0.0	0.5	2.8	7.8	11.3	22.4
Less: Chicopee Valley Aqueduct Projects	(1.2)	(1.9)	(9.1)	(9.5)	(2.9)	(24.8)
FY09-13 CAP	**$244.4**	**$264.1**	**$230.0**	**$207.0**	**$198.4**	**$1,143.8**

Proposed FY14 CIP

FY09-13 Actual Spending	FY09	FY10	FY11	FY12	FY13	Total FY09-13
Projected Expenditures	$182.2	$211.4	$139.3	$137.6	$161.9	$832.4
Contingency	0.0	0.0	0.0	0.0	0.0	$0.0
Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	0.0	$0.0
Less: Chicopee Valley Aqueduct Projects	(0.6)	(0.5)	(0.9)	(0.1)	0.0	($2.1)
Projected FY14-18	**$181.6**	**$210.9**	**$138.4**	**$137.5**	**$161.9**	**$835.2**

Change

Baseline Cap FY09-13 to Actual Spending	FY09	FY10	FY11	FY12	FY13	Total FY09-13
Projected Expenditures	($47.8)	($40.2)	($85.0)	($59.1)	($16.8)	($248.9)
Contingency	(15.6)	(13.8)	(12.0)	(4.9)	(1.7)	(48.0)
Inflation on Unawarded Construction	0.0	(0.5)	(2.8)	(7.8)	(11.3)	(22.4)
Less: Chicopee Valley Aqueduct Projects	0.6	1.4	8.3	9.4	1.2	20.9
FY09-13 CAP Δ ($)	**($62.8)**	**($53.2)**	**($91.6)**	**($69.5)**	**($31.7)**	**($308.6)**
FY09-13 CAP Δ (%)	**-25.7%**	**-20.1%**	**-39.8%**	**-33.6%**	**-16.0%**	**-27.0%**

Project	FY19 Budget	FY17 LTD	Remaining Balance	FY18	FY14 - FY18 Expenditures	FY19	FY20	FY21	FY22	FY23	FY19-FY23 Expenditures	FY24-Beyond FY28 Expenditures
102 Quincy Pump Facilities Total	$ 25,907,202	$ 25,907,202	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
104 Braintree-Weymouth Relief Total	$ 237,017,571	$ 227,704,621	$ 9,312,949	$ -	$ 689	$ 291,000	$ 318,000	$ 2,606,000	$ 2,814,000	$ 471,000	$ 6,500,000	$ 2,812,948
105 New Neponset Valley Relief Total	$ 30,300,304	$ 30,300,304	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
106 Wellesley Ext Replacement Total	$ 64,358,543	$ 64,358,543	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
107 Framingham Extension Relie Total	$ 47,855,986	$ 47,855,986	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
127 Cummingsville Replacement Total	$ 8,998,768	$ 8,998,768	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
130 Siphon Structure Rehabilit Total	$ 7,092,404	$ 939,770	$ 6,152,634	$ -	$ -	$ 268,291	$ 415,277	$ 1,531,329	$ 1,525,339	$ 2,412,398	$ 6,152,634	$ -
131 Upper Neponset Valley Sewe Total	$ 54,174,077	$ 54,174,077	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
132 Corrosion & Odor Control Total	$ 62,301,377	$ 3,700,375	$ 58,601,002	$ 2,658,181	$ 3,357,152	$ 7,928,833	$ 20,610,279	$ 16,341,226	$ 3,602,488	$ 3,703,000	$ 52,185,826	$ 3,756,995
134 Ashland Extension Sewer Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
135 System Master Plan Interce Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
136 West Roxbury Tunnel Total	$ 11,313,573	$ 10,313,573	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ 700,000	$ 300,000	$ 1,000,000	$ -
137 Wastewater Central Monitor Total	$ 27,482,036	$ 19,782,036	$ 7,700,000	$ 140,000	$ 139,835	$ 400,000	$ 480,000	$ 526,666	$ 526,667	$ 526,667	$ 2,460,000	$ 5,100,000
139 South System Relief Projec Total	$ 4,939,244	$ 3,439,244	$ 1,500,000	$ -	$ -	$ -	$ -	$ 187,500	$ 750,000	$ 562,500	$ 1,500,000	$ -
140 Neponset Valley Relief Sew Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
141 Wastewater Process Optimiz Total	$ 10,305,995	$ 1,501,767	$ 8,804,228	$ -	$ 296,588	$ -	$ 40,000	$ 172,976	$ 1,149,229	$ -	$ 1,362,205	$ 3,723,000
142 Wastewater Meter Sys-Equip Total	$ 28,437,912	$ 5,137,912	$ 23,300,000	$ 1,192,619	$ 1,192,619	$ 1,306,762	$ 7,109,745	$ 4,735,566	$ 13,462	$ -	$ 13,165,535	$ -
143 Regional I/I Management Pl Total	$ 168,987	$ 168,987	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
145 Facility Asset Protection Total	$ 463,144,566	$ 57,765,943	$ 405,378,623	$ 43,039,020	$ 83,551,983	$ 36,937,483	$ 35,561,683	$ 35,183,170	$ 29,634,891	$ 18,526,652	$ 155,843,879	$ 180,222,719
146 D.I. Cross Harbor Tunnel Total	$ 5,000,000	$ -	$ 5,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000,000
147 Randolph Trunk Sewer Relie Total	$ 750,000	$ -	$ 750,000	$ -	$ -	$ -	$ -	$ 281,250	$ 375,000	$ 93,750	$ 750,000	$ -
Total Interception & Pumping Total	**$ 1,089,548,545**	**$ 562,049,108**	**$ 527,499,436**	**$ 47,029,820**	**$ 88,538,866**	**$ 47,132,369**	**$ 64,534,984**	**$ 61,565,683**	**$ 41,091,076**	**$ 26,595,967**	**$ 240,920,079**	**$ 200,615,662**
182 DI Primary and Secondary T Total	$ (957,878)	$ (957,878)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
200 DI Plant Optimization Total	$ 33,278,598	$ 33,278,598	$ (1)	$ -	$ (148,080)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
206 DI Treatment Pl Asset Prot Total	$ 961,241,373	$ 244,876,492	$ 716,364,881	$ 8,424,300	$ 105,800,215	$ 44,880,008	$ 82,070,569	$ 90,873,856	$ 90,939,124	$ 56,840,912	$ 365,604,469	$ 311,399,799
210 Clinton Wastewatr Treat Pl Total	$ 28,354,250	$ 12,415,413	$ 15,938,836	$ 3,692,860	$ 13,582,553	$ 1,841,229	$ 870,834	$ 891,667	$ 725,000	$ 516,666	$ 4,845,396	$ 7,400,580
211 Laboratory Services Total	$ 2,211,674	$ 2,211,674	$ -	$ -	$ (16,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Treatment	**$ 1,024,128,017**	**$ 291,824,299**	**$ 732,303,716**	**$ 12,117,160**	**$ 119,218,688**	**$ 46,721,237**	**$ 82,941,403**	**$ 91,765,523**	**$ 91,664,124**	**$ 57,357,578**	**$ 370,449,865**	**$ 318,800,379**
261 Residuals Total	$ 63,810,848	$ 63,810,848	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
271 Residuals Asset Protection Total	$ 103,831,775	$ 831,775	$ 103,000,000	$ 2,069,043	$ 2,175,850	$ 3,986,904	$ 3,088,922	$ 799,636	$ 977,718	$ 1,133,333	$ 9,986,513	$ 47,253,968
Total Residuals	**$ 167,642,623**	**$ 64,642,623**	**$ 103,000,000**	**$ 2,069,043**	**$ 2,175,850**	**$ 3,986,904**	**$ 3,088,922**	**$ 799,636**	**$ 977,718**	**$ 1,133,333**	**$ 9,986,513**	**$ 47,253,968**
339 North Dorchester Bay Total	$ 221,509,794	$ 221,509,793	$ -	$ -	$ (110,813)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
347 East Boston Branch Sewer R Total	$ 85,637,164	$ 85,637,164	$ -	$ -	$ (8,831)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
348 BOS019 Storage Conduit Total	$ 14,287,581	$ 14,287,581	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
349 Chelsea Trunk Sewer Total	$ 29,779,319	$ 29,779,320	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
350 Union Park Detention Treat Total	$ 49,583,407	$ 49,583,407	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
353 Upgrade Existing CSO Facil Total	$ 22,385,200	$ 22,385,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
354 Hydraulic Relief Projects Total	$ 2,294,549	$ 2,294,549	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
355 MWR003 Gate & Siphon Total	$ 4,424,220	$ 4,424,219	$ -	$ -	$ 3,775,474	$ -	$ -	$ -	$ -	$ -	$ -	$ -
357 Charles River CSO Controls Total	$ 3,633,077	$ 3,633,077	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total MWRA Managed	**$ 433,534,311**	**$ 433,534,310**	**$ -**	**$ -**	**$ 3,655,830**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
340 Dorch Bay Sewer Sep (Fox) Total	$ 55,028,985	$ 55,028,985	$ -	$ -	$ 876,690	$ -	$ -	$ -	$ -	$ -	$ -	$ -
341 Dorch Bay Sew Separ (Comm Total	$ 63,619,397	$ 59,861,640	$ 3,757,758	$ -	$ (1,285,510)	$ -	$ 1,878,879	$ 1,878,878	$ -	$ -	$ 3,757,757	$ -
342 Neponset River Sewer Separ Total	$ 2,491,747	$ 2,491,747	$ -	$ -	$ 47,352	$ -	$ -	$ -	$ -	$ -	$ -	$ -
343 Constitution Beach Sewer S Total	$ 3,731,315	$ 3,731,315	$ -	$ -	$ (37,573)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
344 Stony Brook Sewer Separati Total	$ 44,319,314	$ 44,319,314	$ -	$ -	$ 120,930	$ -	$ -	$ -	$ -	$ -	$ -	$ -
346 Cambridge Sewer Separation Total	$ 104,552,056	$ 103,297,503	$ 1,254,553	$ 1,254,553	$ 54,067,851	$ -	$ -	$ -	$ -	$ -	$ -	$ -
351 BWSC Floatables Controls Total	$ 945,936	$ 945,936	$ -	$ -	$ 12,957	$ -	$ -	$ -	$ -	$ -	$ -	$ -
352 Cambridge Floatables Contr Total	$ 1,126,708	$ 1,126,708	$ -	$ -	$ 39,783	$ -	$ -	$ -	$ -	$ -	$ -	$ -
356 Fort Point Channel Sewer S Total	$ 11,507,257	$ 11,507,256	$ 1	$ -	$ (499,452)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
358 Morrissey Boulevard Drain Total	$ 32,181,036	$ 32,181,034	$ 2	$ -	$ (165,754)	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Appendix F

Project	FY19 Budget	FY17 LTD	Remaining Balance	FY18	FY14 - FY18 Expenditures	FY19	FY20	FY21	FY22	FY23	FY19-FY23 Expenditures	FY24-Beyond FY28 Expenditures
359 Reserved Channel Sewer Sep Total	$ 70,524,407	$ 70,519,798	$ 4,609	$ 4,609	$ 10,484,506	$ -	$ -	$ -	$ -	$ -	$ -	$ -
360 Brookline Sewer Separation Total	$ 24,715,291	$ 24,715,291	$ -	$ -	$ (1,282,073)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
361 Bulfinch Triangle Sewer Se Total	$ 9,031,576	$ 9,031,575	$ 1	$ -	$ (825,881)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
324 CSO Support Total	$ 52,809,913	$ 48,208,254	$ 4,601,660	$ 2,028,025	$ 871,867	$ 929,250	$ 929,654	$ 714,731	$ -	$ -	$ 2,573,635	$ -
Total CSO Planning & Support	$ 52,809,914	$ 48,208,254	$ 4,601,659	$ 2,028,025	$ 871,867	$ 929,250	$ 929,654	$ 714,731	$ -	$ -	$ 2,573,635	$ -
Total CSO	$ 910,119,250	$ 900,500,666	$ 9,618,583	$ 3,287,187	$ 66,081,523	$ 929,250	$ 2,808,533	$ 2,593,609	$ -	$ -	$ 6,331,392	$ -
128 I/I Local Financial Assist Total	$ 332,584,985	$ 176,767,917	$ 155,817,067	$ 28,146,234	$ 76,699,349	$ 13,957,648	$ 23,221,346	$ 27,182,149	$ 22,389,740	$ 25,029,181	$ 111,780,064	$ 31,090,796
138 Sewerage System Mapping Up Total	$ 280,876	$ 280,876	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Other Wastewater	$ 332,865,861	$ 177,048,793	$ 155,817,067	$ 28,146,234	$ 76,699,349	$ 13,957,648	$ 23,221,346	$ 27,182,149	$ 22,389,740	$ 25,029,181	$ 111,780,064	$ 31,090,796
Total Waterworks	$ 4,265,405,676	$ 2,028,390,126	$ 2,237,015,552	$ 83,645,981	$ 237,353,698	$ 81,200,102	$ 97,193,763	$ 98,262,034	$ 96,656,619	$ 76,487,347	$ 449,799,866	$ 554,427,840
618 Peabody Pipeline Project Total	$ 12,908,857	$ 30,300	$ 12,878,557	$ 971,557	$ 1,001,857	$ 2,204,000	$ 9,403,000	$ 298,000	$ 2,000	$ -	$ 11,907,000	$ -
677 Valve Replacement Total	$ 21,401,715	$ 12,016,378	$ 9,385,337	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,196,453
678 Boston Low Serv.-Pipe & Va Total	$ 23,690,863	$ 23,690,863	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
683 Heath Hill Road Pipe Repl. Total	$ 19,358,036	$ 19,358,036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
689 James L. Gillis Pump Stn. Total	$ 33,419,007	$ 33,419,008	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
692 NHS - Section 27 Improvmnt Total	$ 1,294,099	$ 123,646	$ 1,170,453	$ 1,950	$ 1,950	$ 5,750	$ 5,750	$ 5,750	$ 205,750	$ 802,050	$ 1,025,050	$ 143,453
693 NHS - Revere & Malden Pipe Total	$ 79,673,893	$ 27,057,514	$ 52,616,379	$ 1,535,224	$ 1,759,998	$ 2,712,203	$ 1,707,000	$ 13,707,500	$ 11,396,958	$ 707,557	$ 30,231,218	$ 18,951,937
702 New Connect Mains-Shaft 7 Total	$ 44,731,691	$ 12,268,490	$ 32,463,201	$ 725,643	$ 2,033,326	$ 2,848,957	$ 5,331,045	$ 8,618,489	$ 4,444,081	$ 936,167	$ 22,178,739	$ 9,558,818
704 Rehab of Other Pump Stns Total	$ 50,257,852	$ 30,057,852	$ 20,200,000	$ -	$ -	$ -	$ 180,000	$ 240,000	$ 244,167	$ 656,667	$ 1,320,834	$ 18,879,166
706 NHS-Conn Mains Section 91 Total	$ 2,360,194	$ 2,360,194	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
708 Nor Ext High Serv New Pipe Total	$ 10,720,937	$ 3,632,119	$ 7,088,819	$ 53,364	$ 53,364	$ 3,000	$ 2,700	$ 1,950	$ 75,100	$ 315,000	$ 397,750	$ 6,637,704
712 Cathodic Pro Of Dis Mains Total	$ 63,823,334	$ 245,869	$ 63,577,465	$ 122,544	$ 227,500	$ 375,116	$ 611,117	$ 1,679,000	$ 3,708,000	$ 12,955,688	$ 19,328,921	$ 44,126,000
713 Spot Pond Supply Mains Reh Total	$ 66,870,148	$ 65,509,309	$ 1,360,839	$ 23,495	$ 4,550,803	$ -	$ 100,000	$ 75,000	$ 875,000	$ 250,000	$ 1,300,000	$ 37,344
714 South. Extra High Sects 41 Total	$ 3,657,244	$ 3,657,244	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
719 Chestnut Hill Connec Mains Total	$ 33,400,559	$ 17,486,675	$ 15,913,884	$ 781,500	$ 781,500	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,125,990
720 Warren Cottage Line Rehab Total	$ 1,204,821	$ 1,204,821	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
721 South Spine Distrib Mains Total	$ 77,575,549	$ 36,683,102	$ 40,892,447	$ 381	$ (8,166)	$ 526,698	$ 474,064	$ 301,201	$ 453,257	$ 456,910	$ 2,212,130	$ 38,571,184
722 NIH Redundancy & Storage Total	$ 118,003,130	$ 27,275,695	$ 90,727,437	$ 23,851,009	$ 45,152,340	$ 14,919,293	$ 5,435,800	$ 4,980,550	$ 7,592,000	$ 7,437,000	$ 40,364,643	$ 26,500,916
723 Nor Low Service Rehab Sec8 Total	$ 67,465,532	$ 2,320,986	$ 65,144,546	$ 1,086,400	$ 1,086,400	$ 1,847,837	$ 9,591,600	$ 9,308,600	$ 9,708,600	$ 8,600	$ 30,465,237	$ 33,592,909
724 Nor High Service - Pipeli Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
725 Hydraulic Model Update Total	$ 598,358	$ 598,358	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
727 SEH Redundancy & Storage Total	$ 127,693,767	$ 15,416,204	$ 112,277,564	$ 12,024,437	$ 20,683,670	$ 16,873,000	$ 13,937,583	$ 3,743,609	$ 434,133	$ 378,000	$ 35,366,325	$ 13,563,026
730 Weston Aqued. Supply Mains Total	$ 80,559,421	$ 80,488,106	$ 71,314	$ 71,314	$ 14,516,124	$ -	$ -	$ -	$ -	$ -	$ -	$ -
731 Lynnfield Pipeline Total	$ 5,625,829	$ 5,625,828	$ -	$ -	$ (51,694)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
732 Walnut St. & Fisher Hill P Total	$ 2,717,141	$ 2,717,141	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
735 Section 80 Rehabilitation Total	$ 12,569,883	$ 233,012	$ 12,336,871	$ 1,693,872	$ 1,926,884	$ 2,250	$ 1,250	$ 1,125	$ 315,125	$ 419,000	$ 738,750	$ 9,904,249
Total Distribution and Pumping	$ 961,581,860	$ 423,476,750	$ 538,105,113	$ 42,942,690	$ 93,715,856	$ 42,318,104	$ 46,780,909	$ 42,960,774	$ 39,454,171	$ 25,322,639	$ 196,836,597	$ 241,789,149
542 Carroll Water Treatment Pl Total	$ 435,619,624	$ 419,264,339	$ 16,355,285	$ 3,764,894	$ 11,820,708	$ 1,723,574	$ 1,062,010	$ 554,807	$ -	$ -	$ 3,340,391	$ 9,250,000
543 Quabbin Water Treatment Pl Total	$ 19,972,883	$ 19,972,879	$ 3	$ -	$ 7,204,637	$ -	$ -	$ -	$ -	$ -	$ -	$ -
544 Norumbega Covered Storage Total	$ 106,674,147	$ 106,674,146	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
545 Blue Hills Covered Storage Total	$ 40,082,837	$ 40,082,837	$ -	$ -	$ 120,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
550 Spot Pond Storage Facility Total	$ 60,271,716	$ 59,954,381	$ 317,334	$ 317,334	$ 35,677,914	$ -	$ -	$ -	$ -	$ -	$ -	$ -
555 CWTP Asset Protection Total	$ 41,570,000	$ -	$ 41,570,000	$ -	$ -	$ -	$ 550,000	$ 2,270,000	$ 2,200,000	$ 500,000	$ 5,520,000	$ 5,279,000
Total Drinking Water Quality Improvements	$ 704,191,207	$ 645,948,582	$ 58,242,622	$ 4,082,228	$ 54,823,259	$ 1,723,574	$ 1,612,010	$ 2,824,807	$ 2,200,000	$ 500,000	$ 8,860,391	$ 14,529,000
753 Central Monitoring System Total	$ 39,017,211	$ 20,609,110	$ 18,408,101	$ 160,246	$ 4,965,628	$ 700,000	$ 1,975,000	$ 3,950,000	$ 2,800,000	$ 775,000	$ 10,200,000	$ 4,976,000
763 Distribut Systems Fac. Map Total	$ 2,798,919	$ 1,036,368	$ 1,762,551	$ -	$ -	$ -	$ 875,000	$ 510,956	$ 276,595	$ 100,000	$ 1,762,551	$ -
764 Local Water Infrastr Rehab Total	$ 7,487,762	$ 7,487,762	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
765 Local Water Pipeline Imp. Total	$ -	$ 128,447,970	$ (128,447,969)	$ 11,237,479	$ 12,826,208	$ 13,297,199	$ 14,006,307	$ 10,735,468	$ 8,705,885	$ 5,523,645	$ 52,268,505	$ (213,069,106)
766 Waterworks Facility Asset Total	$ 38,131,758	$ 2,367,490	$ 35,764,268	$ 65,016	$ 1,886,487	$ 7,763,000	$ 2,986,389	$ 5,526,765	$ 8,852,048	$ 2,912,235	$ 28,040,437	$ 7,658,815
Total Waterworks Other	$ 87,435,650	$ 159,948,700	$ (72,513,049)	$ 11,462,741	$ 19,678,323	$ 21,760,199	$ 19,842,696	$ 20,723,189	$ 20,634,528	$ 9,310,880	$ 92,271,493	$ (200,434,291)
597 Winsor Station Pipeline Total	$ 48,739,416	$ 5,760,423	$ 42,978,993	$ 375,084	$ 4,739,915	$ 13,293	$ -	$ -	$ 217,500	$ 870,000	$ 1,100,793	$ 41,503,104

Appendix F

Project	FY19 Budget	FY17 LTD	Remaining Balance	FY18	FY14 - FY18 Expenditures	FY19	FY20	FY21	FY22	FY23	FY19-FY23 Expenditures	FY24-Beyond FY28 Expenditures
601 Sluice Gate Rehabilitation Total	$ 9,158,411	$ 9,158,411	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
604 MetroWest Tunnel Total	$ 700,184,181	$ 697,180,660	$ 3,003,522	$ 1,696	$ 1,783,848	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,001,822
615 Chicopee Valley Aqued. Red Total	$ 8,666,292	$ 8,666,291	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
616 Quabbin Transmission Syst. Total	$ 16,798,914	$ 8,322,493	$ 8,476,421	$ 376,420	$ 1,496,449	$ 240,000	$ 740,000	$ 2,440,000	$ 2,640,000	$ 490,000	$ 6,550,000	$ 1,525,000
617 Sudbury/Weston Aqued. Rep Total	$ 10,393,399	$ 2,580,287	$ 7,813,111	$ 188,580	$ 2,108,919	$ 51,042	$ 87,500	$ 554,167	$ 420,833	$ 36,458	$ 1,150,000	$ 5,807,531
620 Wachusett Res Spillway Imp Total	$ 9,287,460	$ 9,287,460	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
621 Watershed Land Total	$ 29,000,000	$ 20,482,400	$ 8,517,600	$ 1,500,000	$ 4,640,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 5,000,000	$ 2,017,600
622 Cosgrove Tunnel Redundancy Total	$ 57,237,697	$ 30,106,010	$ 27,131,688	$ 21,172,923	$ 50,103,489	$ 5,202,645	$ 753,697	$ 2,424	$ -	$ -	$ 5,958,766	$ -
623 Dam Projects Total	$ 5,876,316	$ 3,115,745	$ 2,760,571	$ 566	$ 31,129	$ 79,000	$ 1,305,000	$ 468,858	$ 282,143	$ 357,143	$ 2,492,144	$ 267,856
625 Metro Tunnel Redundancy Total	$ 1,404,925,794	$ 3,442,599	$ 1,401,483,195	$ 18,746	$ 1,794,889	$ 1,721,245	$ 3,442,491	$ 3,442,491	$ 2,008,123	$ 6,424,475	$ 17,038,825	$ 347,970,470
628 Metro Redu Interim Impr Total	$ 194,629,079	$ 913,315	$ 193,715,764	$ 1,064,307	$ 1,977,622	$ 5,251,000	$ 21,579,460	$ 23,638,324	$ 27,111,321	$ 31,010,752	$ 108,590,857	$ 83,560,600
Total Transmission	**$ 2,512,196,959**	**$ 799,016,094**	**$ 1,713,180,865**	**$ 25,158,322**	**$ 69,136,260**	**$ 15,398,225**	**$ 28,958,148**	**$ 31,753,264**	**$ 34,367,920**	**$ 41,353,828**	**$ 151,831,385**	**$ 498,543,983**
Total Business & Operations Support	**$ 151,829,871**	**$ 97,783,079**	**$ 54,046,793**	**$ 3,198,208**	**$ 23,539,426**	**$ 13,271,381**	**$ 12,001,994**	**$ 8,616,706**	**$ 5,239,741**	**$ 5,722,112**	**$ 44,851,934**	**$ 5,996,652**
881 Equipment Purchase Total	$ 33,166,756	$ 20,323,332	$ 12,843,424	$ 1,500,368	$ 9,716,371	$ 2,240,000	$ 2,142,500	$ 2,012,500	$ 2,022,500	$ 2,925,556	$ 11,343,056	$ -
925 Technical Assistance Total	$ 1,150,000	$ -	$ 1,150,000	$ -	$ -	$ 383,333	$ 383,333	$ 383,334	$ -	$ -	$ 1,150,000	$ -
930 MWRA Facility - Chelsea Total	$ 9,812,071	$ 9,812,071	$ -	$ -	$ (1,562)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
931 Business Systems Plan Total	$ 24,562,604	$ 24,562,604	$ -	$ -	$ 111,373	$ -	$ -	$ -	$ -	$ -	$ -	$ -
932 Environmental Remediation Total	$ 1,478,602	$ 1,478,602	$ -	$ -	$ (200)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
933 Capital Maintenance Planni Total	$ 23,693,251	$ 13,151,948	$ 10,541,304	$ 1,232,949	$ 4,260,654	$ 3,558,356	$ 3,400,000	$ 1,600,000	$ 750,000	$ -	$ 9,308,356	$ -
934 MWRA Facilities Management Total	$ 2,150,535	$ 370,533	$ 1,780,002	$ -	$ -	$ 140,000	$ 888,002	$ 752,000	$ -	$ -	$ 1,780,002	$ -
935 Alternative Energy Initiat Total	$ 23,131,330	$ 18,052,831	$ 5,078,498	$ 20,179	$ 876,206	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,058,319
940 Applicat Improv Program Total	$ 12,348,230	$ 2,670,409	$ 9,677,821	$ 311,089	$ 2,908,373	$ 1,366,954	$ 1,895,348	$ 872,430	$ 1,676,111	$ 2,617,556	$ 8,428,399	$ 938,333
942 Info Security Program ISP Total	$ 3,726,636	$ 1,681,336	$ 2,045,300	$ -	$ 1,146,146	$ 1,028,266	$ 594,333	$ 120,000	$ 295,701	$ 7,000	$ 2,045,300	$ -
944 Info Tech Mgmt Program Total	$ 635,640	$ -	$ 635,640	$ -	$ -	$ 200,000	$ 385,640	$ 50,000	$ -	$ -	$ 635,640	$ -
946 IT Infrastructure Program Total	$ 15,974,217	$ 5,679,413	$ 10,294,804	$ 133,623	$ 4,522,065	$ 4,354,472	$ 2,312,838	$ 2,826,442	$ 495,429	$ 172,000	$ 10,161,181	$ -

Appendix G

Overview of the Proposed FY19 CIP and Changes from the Final FY18 CIP

Program and Project	FY18 Final Total Budget Amount	FY18 Final FY14-18	FY18 Final FY19-23	FY18 Final Beyond 23	FY19 Proposed Total Budget Amount	FY19 Proposed FY14-18	FY19 Proposed FY19-23	FY19 Proposed Beyond 23	Change from Final FY18 Total Budget Amount	Change from Final FY18 FY14-18	Change from Final FY18 FY19-23	Change from Final FY18 Beyond 23
CSO	**910,573**	**66,260**	**6,605**	**-**	**910,118**	**66,080**	**6,331**	**-**	**(455)**	**(180)**	**(274)**	**-**
340 Dorchester Bay Sewer Separation (Fox Point)	54,626	473	-	-	55,029	877	-	-	403	404	-	-
341 Dorchester Bay Sewer Separation (Commercial Point)	64,009	(896)	3,758	-	63,619	(1,286)	3,758	-	(390)	(390)	-	-
342 Neponset River Sewer Separation	2,549	105	-	-	2,492	47	-	-	(57)	(58)	-	-
343 Constitution Beach Sewer Separation	3,731	(38)	-	-	3,731	(38)	-	-	-	-	-	-
344 Stony Brook Sewer Separation	44,268	70	-	-	44,319	121	-	-	51	51	-	-
346 Cambridge Sewer Separation	104,552	54,068	-	-	104,552	54,068	-	-	-	-	-	-
351 BWSC Floatables Controls	946	13	-	-	946	13	-	-	-	-	-	-
352 Cambridge Floatables Control	1,127	40	-	-	1,127	40	-	-	-	-	-	-
356 Fort Point Channel Sewer Separation	11,872	(134)	-	-	11,507	(499)	-	-	(365)	(365)	-	-
358 Morrissey Boulevard Drain	32,186	(161)	-	-	32,181	(166)	-	-	(5)	(5)	-	-
359 Reserved Channel Sewer Separation	70,517	10,477	-	-	70,524	10,485	-	-	7	8	-	-
360 Brookline Sewer Separation	24,715	(1,282)	-	-	24,715	(1,282)	-	-	-	-	-	-
361 Bulfinch Triangle Sewer Separation	9,054	(803)	-	-	9,032	(826)	-	-	(22)	(23)	-	-
339 North Dorchester Bay	221,510	(111)	-	-	221,510	(111)	-	-	-	-	-	-
347 East Boston Branch Sewer Relief	85,637	(9)	-	-	85,637	(9)	-	-	-	-	-	-
348 BOS019 Storage Conduit	14,288	-	-	-	14,288	-	-	-	-	-	-	-
349 Chelsea Trunk Sewer	29,779	-	-	-	29,779	-	-	-	-	-	-	-
350 Union Park Detention Treatment Facility	49,583	-	-	-	49,583	-	-	-	-	-	-	-
353 Upgrade Existing CSO Facilities	22,385	-	-	-	22,385	-	-	-	-	-	-	-
354 Hydraulic Relief Projects	2,295	-	-	-	2,295	-	-	-	-	-	-	-
355 MWR003 Gate & Siphon	4,425	3,776	-	-	4,424	3,775	-	-	(1)	(1)	-	-
357 Charles River CSO Controls	3,633	-	-	-	3,633	-	-	-	-	-	-	-
324 CSO Support	52,886	673	2,848	-	52,810	872	2,574	-	(76)	199	(274)	-
Other Wastewater	**242,866**	**72,665**	**52,114**	**(10,409)**	**332,866**	**76,699**	**111,780**	**15,891**	**90,000**	**4,034**	**59,666**	**26,300**
128 I/I Local Financial Assistance	242,585	72,665	52,114	(10,409)	332,585	76,699	111,780	15,891	90,000	4,034	59,666	26,300
138 Sewerage System Mapping Upgrade	281	-	-	-	281	-	-	-	-	-	-	-
Total Waterworks	**4,010,951**	**236,427**	**576,515**	**1,323,338**	**4,265,407**	**237,353**	**449,804**	**1,703,573**	**212,886**	**926**	**(132,231)**	**344,185**
Drinking Water Quality	**666,791**	**54,972**	**6,195**	**10,417**	**704,192**	**54,824**	**8,860**	**45,300**	**(4,169)**	**(148)**	**(2,855)**	**(1,167)**
542 Carroll Water Treatment Plant	439,799	11,979	6,195	10,417	435,620	11,821	3,340	9,250	(4,179)	(158)	(2,855)	(1,167)
543 Quabbin Water Treatment Plant	19,973	7,205	-	-	19,973	7,205	-	-	-	-	-	-
544 Norumbega Covered Storage	106,674	-	-	-	106,674	-	-	-	-	-	-	-
545 Blue Hills Covered Storage	40,083	120	-	-	40,083	120	-	-	-	-	-	-
550 Spot Pond Storage Facility	60,262	35,668	-	-	60,272	35,678	-	-	10	10	-	-
555 CWTP Asset Protection	0	0	0	0	41,570	-	5,520	36,050	41,570	-	5,520	36,050

Appendix G

Overview of the Proposed FY19 CIP and Changes from the Final FY18 CIP

Program and Project	FY18 Final				FY19 Proposed				Change from Final FY18			
	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23
Transmission	**2,423,540**	**65,671**	**276,132**	**1,326,706**	**2,512,197**	**69,138**	**151,834**	**1,536,193**	**88,657**	**3,467**	**(124,298)**	**209,487**
597 Winsor Station Pipeline	34,243	4,837	24,950	3,061	48,739	4,740	1,101	41,503	14,496	(97)	(23,849)	38,442
601 Sluice Gate Rehabilitation	9,158	-	-	-	9,158	-	-	-	-	-	-	-
604 MetroWest Tunnel	701,189	1,791	4,000	-	700,184	1,784	-	3,002	(1,005)	(7)	(4,000)	3,002
615 Chicopee Valley Aqueduct Redundancy	8,666	-	-	-	8,666	-	-	-	-	-	-	-
616 Quabbin Transmission System	16,419	1,316	7,900	-	16,799	1,496	6,550	1,550	380	180	(1,350)	1,550
617 Sudbury/Weston Aqueduct Repairs	6,477	2,109	3,248	460	10,393	2,109	1,150	6,475	3,916	-	(2,098)	6,015
620 Wachusett Reservior Spillway Improvement	9,287	-	-	-	9,287	-	-	-	-	-	-	-
621 Watershed Land	24,000	4,732	1,926	-	29,000	4,640	5,000	2,018	5,000	(92)	3,074	2,018
622 Cosgrove/Wachusett Redundancy	54,316	46,659	6,482	-	57,238	50,103	5,959	-	2,922	3,444	(523)	-
623 Dam Projects	4,066	31	951	-	5,876	31	2,492	268	1,810	-	1,541	268
625 Metro Tunnel Redundancy	1,357,686	1,749	95,972	1,258,298	1,404,926	1,795	17,039	1,384,425	47,240	46	(78,933)	126,127
628 Metro Redundancy Interim Improvement	180,731	1,935	114,161	64,635	194,629	1,978	108,591	84,060	13,898	43	(5,570)	19,425
630 Watershed Division Capital Improvement	17,300	510	16,540	250	17,300	460	3,950	12,890	-	(50)	(12,590)	12,640
Distribution & Pumping	**839,544**	**92,306**	**208,134**	**166,403**	**961,582**	**93,714**	**196,838**	**298,326**	**122,038**	**1,408**	**(11,296)**	**131,923**
618 Northern High NW Tran Sections 70 & 71	12,910	1,006	11,904	-	12,909	1,002	11,907	-	(1)	(4)	3	-
677 Valve Replacement	20,115	-	3,558	4,540	21,402	-	-	9,386	1,287	-	(3,558)	4,846
678 Boston Low Service-Pipe & Valve Rehabilitation	23,691	-	-	-	23,691	-	-	-	-	-	-	-
683 Heath Hill Road Pipe Replacement	19,358	-	-	-	19,358	-	-	-	-	-	-	-
689 James L. Gillis Pump Station Rehabilitation	33,419	-	-	-	33,419	-	-	-	-	-	-	-
692 NHS - Section 27 Improvements	1,134	-	1,010	-	1,294	2	1,025	143	160	2	15	143
693 NHS - Revere & Malden Pipeline Improvement	65,373	2,064	36,409	67	79,674	1,760	30,231	20,850	14,301	(304)	(6,178)	20,783
702 New Connect Mains-Shaft 7 to WASM 3	38,841	2,301	21,691	3,889	44,732	2,033	22,179	9,559	5,891	(268)	488	5,670
704 Rehabilitation of Other Pump Stations	50,258	-	1,321	18,879	50,258	-	1,321	18,879	-	-	-	-
706 NHS-Connecting Mains from Section 91	2,360	-	-	-	2,360	-	-	-	-	-	-	-
708 Northern Extra High Service New Pipelines	8,045	56	3,600	757	10,721	53	398	6,637	2,676	(3)	(3,202)	5,880
712 Cathodic Protection Of Distrubution Mains	1,704	218	1,345	-	63,823	227	19,329	44,126	62,119	9	17,984	44,126
713 Spot Pond Supply Mains Rehabilitation	66,858	4,551	1,326	-	66,870	4,551	1,300	37	12	-	(26)	37
714 Southern Extra High Sections 41 & 42	3,657	-	-	-	3,657	-	-	-	-	-	-	-
719 Chestnut Hill Connecting Mains	33,094	1,000	14,602	6	33,401	782	-	15,132	307	(218)	(14,602)	15,126
720 Warren Cottage Line Rehabilitation	1,205	-	-	-	1,205	-	-	-	-	-	-	-
721 South Spine Distribution Mains	76,281	69	4,342	35,179	77,576	(8)	2,212	38,680	1,295	(77)	(2,130)	3,501
722 NIH Redundancy & Storage	113,121	41,648	42,516	22,982	118,003	45,152	40,365	26,512	4,882	3,504	(2,151)	3,530
723 Northern Low Service Rehabilitation Section 8	56,889	1,028	31,827	21,714	67,466	1,086	30,465	33,594	10,577	58	(1,362)	11,880
724 Northern High Service - Pipeline Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	-
725 Hydraulic Model Update	598	-	-	-	598	-	-	-	-	-	-	-
727 Southern Extra High Redundancy & Storage	109,410	21,928	24,051	56,673	127,694	20,684	35,366	64,887	18,284	(1,244)	11,315	8,214
730 Weston Aqueduct Supply Mains	80,696	14,573	80	-	80,559	14,516	-	-	(137)	(57)	(80)	-
731 Lynnfield Pipeline	5,626	(52)	-	-	5,626	(52)	-	-	-	-	-	-
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	2,717	-	-	-	2,717	-	-	-	-	-	-	-

Appendix G

Overview of the Proposed FY19 CIP and Changes from the Final FY18 CIP

	FY18 Final				FY19 Proposed				Change from Final FY18			
Program and Project	**Total Budget Amount**	**FY14-18**	**FY19-23**	**Beyond 23**	**Total Budget Amount**	**FY14-18**	**FY19-23**	**Beyond 23**	**Total Budget Amount**	**FY14-18**	**FY19-23**	**Beyond 23**
733 NHS Pipeline Rehabilitation 13-18 & 48	-	-	-	-	-	-	-	-	-	-	-	-
734 Southern Extra High Pipelines-Sections 30, 39,40, & 44	-	-	-	-	-	-	-	-	-	-	-	-
735 Section 80 Rehabilitation	12,185	1,917	8,551	1,717	12,570	1,927	739	9,904	385	10	(7,812)	8,187
Other	**81,076**	**23,478**	**86,054**	**(180,190)**	**87,436**	**19,677**	**92,272**	**(176,248)**	**6,360**	**(3,801)**	**6,218**	**3,942**
753 Central Monitoring System	39,040	5,542	5,457	12,237	39,017	4,966	10,200	8,048	(23)	(576)	4,743	(4,189)
763 Distribution Systems Facilities Mapping	2,299	-	1,263	-	2,799	-	1,763	-	500	-	500	-
764 Local Water Infrastructure Rehabilitation Assistance Program	7,488	-	-	-	7,488	-	-	-	-	-	-	-
765 Local Water Pipeline Improvement Loan Program	-	15,106	51,224	(193,189)	-	12,826	52,269	(191,954)	-	(2,280)	1,045	1,235
766 Waterworks Facility Asset Protection	32,249	2,831	28,110	762	38,132	1,886	28,040	7,658	5,883	(945)	(70)	6,896
Business & Operations Support	**131,036**	**29,250**	**24,344**	**-**	**151,829**	**23,537**	**44,852**	**5,997**	**20,793**	**(5,713)**	**20,508**	**5,997**
881 Equipment Purchase	29,408	11,354	5,946	-	33,167	9,716	11,343	-	3,759	(1,638)	5,397	-
925 Technical Assistance	1,150	383	767	-	1,150	-	1,150	-	-	(383)	383	-
930 MWRA Facility - Chelsea	9,812	(2)	-	-	9,812	(2)	-	-	-	-	-	-
931 Business Systems Plan	24,563	111	-	-	24,563	111	-	-	-	-	-	-
932 Environmental Remediation	1,479	-	-	-	1,479	-	-	-	-	-	-	-
933 Capital Maintenance Planning	15,208	4,505	579	-	23,693	4,261	9,308	-	8,485	(244)	8,729	-
934 MWRA Facilities Management	2,151	-	1,780	-	2,151	-	1,780	-	-	-	-	-
935 Alternative Energy Initiatives	23,271	1,191	4,883	-	23,131	876	-	5,058	(140)	(315)	(4,883)	5,058
940 Applicat Improv Program	9,980	4,347	5,560	-	12,348	2,908	8,428	939	2,368	(1,439)	2,868	939
942 Info Security Program ISP	2,822	1,741	546	-	3,727	1,146	2,045	-	905	(595)	1,499	-
944 Info Tech Mgmt Program	923	-	923	-	636	-	636	-	(287)	-	(287)	-
946 IT Infrastructure Program	10,271	5,621	3,359	-	15,974	4,522	10,161	-	5,703	(1,099)	6,802	-

Appendix H

New Capital Projects Added to FY19 CIP

Project	Program	Project	Subphase	Contract Number	Total Contract Amount	FY19	FY20	FY21	FY22	FY23	FY19-23	Beyond FY23	Total Expenditures
1	Treatment	Deer Island Treatement Plant Asset Protection	Hydroturbine Replacements Design/ESDC/REI	7570	$ 2,000,000	$ 280,000	$ 420,000	$ 230,380	$ 394,936	$ 394,937	$ **1,720,253**	$ 279,747	$ **2,000,000**
	Treatment	Deer Island Treatement Plant Asset Protection	Hydroturbine Replacements Construction	7571	$ 10,000,000			$ 1,944,444	$ 3,333,333	$ 3,333,334	$ **8,611,111**	$ 1,388,889	$ **10,000,000**
2	Treatment	Deer Island Treatement Plant Asset Protection	Bidirectional Radio Repeater System Upgrade	7122	$ 3,000,000	$ 1,501,500	$ 1,498,500				$ **3,000,000**		$ **3,000,000**
3	Other Wastewater	I/I Local Financial Assistance Program	Phases 11 and 12	7260-7265	$ 90,000,000	$ 4,000,000	$ 9,900,000	$ 13,650,000	$ 17,300,000	$ 18,850,000	$ **63,700,000**	$ 26,300,000	$ **90,000,000**
4	Drinking Water Quality Improvements	Carroll Water Treatment Asset Protection	HVAC Equipment Replacement	7605	$ 2,300,000		$200,000	$1,000,000	$1,100,000		$ **2,300,000**		$ **2,300,000**
5	Drinking Water Quality Improvements	Carroll Water Treatment Asset Protection	CWTP Chemical Pipe System Pipe, Pumps and Tank Replacement	7597	$ 4,000,000						$ -	4,000,000	$ **4,000,000**
6	Drinking Water Quality Improvements	Carroll Water Treatment Asset Protection	CWTP Water Pump Replacement	7606	$ 2,000,000						$ -	2,000,000	$ **2,000,000**
7	Drinking Water Quality Improvements	Carroll Water Treatment Asset Protection	Ozone Generator Replacement	7607	$ 20,000,000						$ -	20,000,000	$ **20,000,000**
8	Drinking Water Quality Improvements	Carroll Water Treatment Asset Protection	Ultra Violet Reactor Replacement	7608	$ 10,000,000						$ -	10,000,000	$ **10,000,000**
9	Transmission	Dam Projects	Sudbury/Foss Dam Impr/Wach North Dike Overtopping Protection Design CA/RI	7614	$ 210,000	79,000	105,000	26,000			$ **210,000**		$ **210,000**
	Transmission	Dam Projects	Sudbury/Foss Dam Improvements/Wachusett North Dike Overtopping Protection Construction	7615	$ 1,600,000		1,200,000	400,000			$ **1,600,000**		$ **1,600,000**

Appendix H

New Capital Projects Added to FY19 CIP

Project	Program	Project	Subphase	Contract Number	Total Contract Amount	FY19	FY20	FY21	FY22	FY23	FY19-23	Beyond FY23	Total Expenditures
10	Transmission	Sudbury/Weston Aqueduct Repairs	Waban Arches Bridge - Rehabilitation Design CA/RI	7616	$ 300,000						$ -	300,000	$ 300,000
	Transmission	Sudbury/Weston Aqueduct Repairs	Waban Arches Bridge - Rehabilitation Construction	7617	$ 1,200,000						$ -	1,200,000	$ 1,200,000
11	Transmission	Sudbury/Weston Aqueduct Repairs	Farm Pond Inlet Chamber and Gate House - Rehabilitation Design CA/RI	7618	$ 400,000						$ -	400,000	$ 400,000
	Transmission	Sudbury/Weston Aqueduct Repairs	Farm Pond Inlet Chamber and Gate House - Rehabilitation Construction	7619	$ 2,000,000						$ -	2,000,000	$ 2,000,000
12	Transmission	Watershed Land	Watershed Land Acquisition	7069	$ 5,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	$ 5,000,000		$ 5,000,000
13	Distribution and Pumping	Cathodic Protection	Cathodic Protection (Western System) Design CA/RI	7609	$ 930,000		186,000	248,000	248,000	227,000	$ 909,000	21,000	$ 930,000
	Distribution and Pumping	Cathodic Protection	Cathodic Protection (Western System) Construction	7610	$ 4,300,000				1,612,000	2,150,000	$ 3,762,000	538,000	$ 4,300,000
14	Distribution and Pumping	Cathodic Protection	Cathodic Protection (Metro System) Design CA/RI	7611	$ 9,900,000			1,256,000	1,673,000	1,673,000	$ 4,602,000	5,298,000	$ 9,900,000
	Distribution and Pumping	Cathodic Protection	Cathodic Protection (Metro System) Construction	7612	$ 47,100,000					8,831,000	$ 8,831,000	38,269,000	$ 47,100,000
15	Distribution and Pumping	NHS Revere & Malden Pipeline Improvements	Sections 13 & 48 Rehabilitation Design CA/RI	7602	$ 2,150,000						$ -	2,150,000	$ 2,150,000
	Distribution and Pumping	NHS Revere & Malden Pipeline Improvements	Sections 13 & 48 Rehabilitation Construction	7603	$ 10,750,000						$ -	10,750,000	$ 10,750,000
16	Other Waterworks	Waterworks Facility Asset Protection	New Roofs at Water Pumping Stations Design CA/RI	7628	$ 100,000						$ -	100,000	$ 100,000
	Other Waterworks	Waterworks Facility Asset Protection	New Roofs at Water Pumping Stations Construction	7626	$ 500,000						$ -	500,000	$ 500,000

Appendix H

New Capital Projects Added to FY19 CIP

Project	Program	Project	Subphase	Contract Number	Total Contract Amount	FY19	FY20	FY21	FY22	FY23	FY19-23	Beyond FY23	Total Expenditures
17	Other Waterworks	Distribution System Facilities Mapping	Water System Hydraulic Model	7613	$ 500,000		375,000	125,000			$ 500,000		$ 500,000
	Business & Operations Support	Capital Maintenance Planning & Support	As-Needed CA/REI Contract 1	7629	$ 2,250,000	375,000	750,000	750,000	375,000		$ 2,250,000		$ 2,250,000
18	Business & Operations Support	Capital Maintenance Planning & Support	As-Needed CA/REI Contract 2	7630	$ 2,250,000	375,000	750,000	750,000	375,000		$ 2,250,000		$ 2,250,000
	SUMMARY:												
	Total Wastewater Projects				$ 105,000,000	$ 5,781,500	$ 11,818,500	$ 15,824,824	$ 21,028,269	$ 22,578,271	$ 77,031,364	$ 27,968,636	$ 105,000,000
	Total Waterworks Projects				$ 125,240,000	$ 1,079,000	$ 3,066,000	$ 4,055,000	$ 5,633,000	$ 13,881,000	$ 27,714,000	$ 97,526,000	$ 125,240,000
	Business & Operations Support				$ 4,500,000	$ 750,000	$ 1,500,000	$ 1,500,000	$ 750,000	$ -	$ 4,500,000	$ -	$ 4,500,000
	Total Projects				$ 234,740,000	$ 7,610,500	$ 16,384,500	$ 21,379,824	$ 27,411,269	$ 36,459,271	$ 109,245,364	$ 125,494,636	$ 234,740,000

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Connecticut River Basin – Richard N. Palmer
Boston Harbor – Vacant (2)

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